AN ANALYSIS OF FAUNAL REMAINS FROM TWO GROSWATER PALAEOESKIMO SITES AT PORT AU CHOIX, NORTHWESTERN NEWFOUNDLAND: PHILLIP'S GARDEN WEST (EeBi-1 1) AND PHILLIP'S GARDEN EAST (EeBi-1)

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An Analysis of Faunal Remains from Two Groswater Palaeoeskimo Sites at Port au Choix, Northwestern Newfoundland: Phillip's Garden West (EeBi-11) and Phillip's Garden East (EeBi-1)

by

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Abstract

This research involves the examination of faunal remains from two Groswater Palaeoeskimo sites on the Point Riche Peninsula, northwestern Newfoundland. The purpose of this study is to understand the settlement and subsistence patterns of the inhabitants of Phillip's Garden West and the adjacent site of Phillip's Garden East. A thorough examination of the faunal remains allows a quantified presentation of the species exploited and season of occupation. The most important species exploited at these sites is seal, particularly the harp seal that still frequents this coast. An examination of the frequency of seal body parts at the sites allows a discussion of the processing of this vital resource. In addition, seal body part frequency offers insights into the nature of the occupation at both sites, and supports interpretations of Phillip's Garden West as an important location for ritual activity associated with seal exploitation.

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This thesis is dedicated to the memory
of Dr. Ralph Pastore, a great scholar and teacher.

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CHAPTER 1
INTRODUCTION

> The ultimate goal of much zooarchaeological research is to explore the causes, processes, organization, and consequences of human behavior through time and space from the perspective of animal remains (Reitz and Wing 1999:326).

This research involves the analysis of faunal material from two Groswater Palaeoeskimo sites, Phillip's Garden East (EeBi-1) and Phillip's Garden West (EeBi-11), at Port au Choix Newfoundland (Figure 1.1). The aim of this analysis is to understand the settlement and subsistence practices of the sites' inhabitants. Although a number of Groswater Palaeoeskimo sites in Newfoundland and Labrador have been excavated and interpreted, few have dealt specifically with reconstructing settlement and subsistence information, particularly from faunal evidence. On sites yielding faunal remains, only species lists and general seasonality interpretations have been offered (Auger 1985; Kennet 1991; Murray n.d.). The present research entails a full examination of three dated samples of faunal material from Phillip's Garden West, and one large sample from Phillip's Garden East. The analysis includes the identification and relative frequency of species and a discussion of season of occupation. Seal bones dominate these assemblages, demonstrating the enormous importance of this species to the diet. In order to understand how these animals were hunted, processed and disposed of, a study of the relative frequency of seal body parts is presented and seal elements are examined for cut marks; these are described, quantified, and a sequence of butchering is presented in order to see

the practical and possible cultural factors that influenced the way seals were butchered. A detailed analysis of the faunal remains from these sites will contribute to an understanding of Groswater Palaeoeskimo culture, as well as the nature of their occupation in the Port au Choix region.

The stone tool assemblage at Phillip's Garden West is not typical of those found at other Groswater Palaeoeskimo sites. Various explanations have been explored to account for this situation, including possible cultural, chronological and functional differences at the site (Renouf in press). Renouf demonstrates that the Phillip's Garden West variant is not the result of cultural differences. Furthermore, as dates from this site largely overlap with those from other Groswater Palaeoeskimo sites, chronology also does not appear to be a factor. She suggests that there is a difference in some aspect of the function of Phillip's Garden West, and that this site may have featured ritual activities surrounding the hunting of seals. An examination of the faunal material from the site has the potential to reveal patterns of animal exploitation, and perhaps offer insight into the possibility of ritual behaviour. A comparison of seal body part frequency at the two sites allows an opportunity to view similarities and differences in the treatment of seal at the two adjacent sites.

Phillip's Garden West and Phillip's Garden East are located within one kilometer of each other on the Point Riche Peninsula on the west coast of the Great Northern Peninsula in Newfoundland (Figure 1.1, Plate 1.1). Like most Groswater Palaeoeskimo sites adjacent to the sea, these offer easy access to the ocean and good vantage points for

monitoring marine game. The Point Riche Peninsula is a low and open landscape, jutting out into the sea south of the Strait of Belle Isle (Figure 1.2). It is exposed to the onshore prevailing winds from the west, and in most areas one has an excellent view of the ocean where large sea mammals pass throughout the spring and summer. The landscape of the peninsula is fairly barren with some mixed spruce and shrub outcrops. West of Point Riche, and running the length of the Great Northern Peninsula are the Long Range Mountains with a series of plateaus and peaks. At their lower slopes and along the interior are thick conifer forests with occasional open plains. These regions are home to a variety of terrestrial mammals and birds. In the past, the environment was cooler and conditions less stable, likely resulting in a more barren landscape in the Point Riche region (Macphersn 1995).

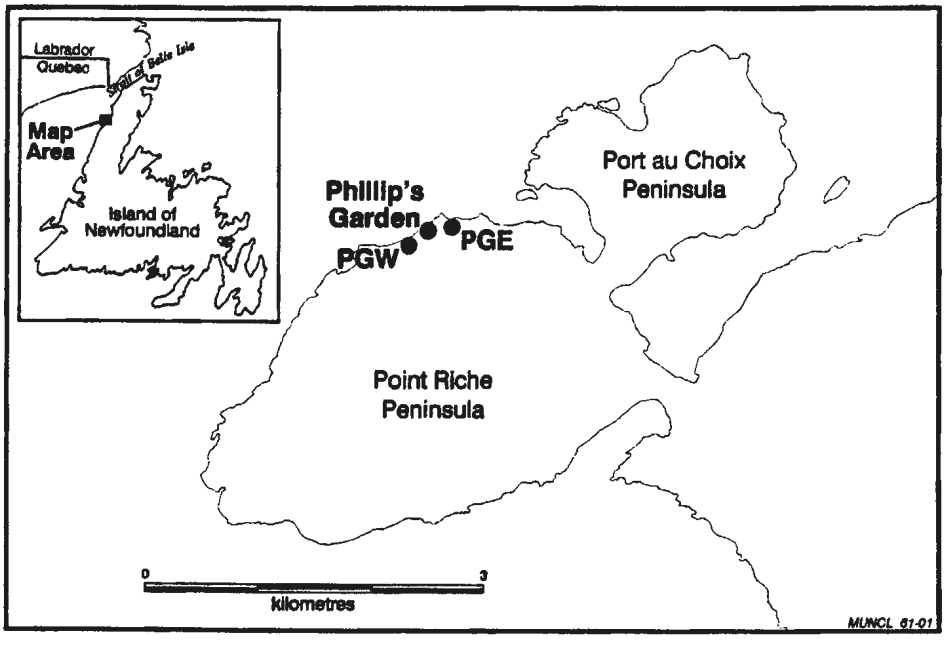


Figure 1.1 **Location of Phillip's Garden West and Phillip's Garden East**

Plate 1.1 **Location of Phillip's Garden East EeBi-1 (left), and Phillip's Garden West EeBi-11 (right)**

Figure 1.2 **Location of Place Names Mentioned in the Text**

This thesis is divided into chapters that approach the subject of Groswater Palaeoeskimo settlement and subsistence from the general to the specific. It starts with a discussion of the resources of the region, then of the Groswater Palaeoeskimo culture and the sites at Phillip's Garden West and Phillip's Garden East. This is followed by a detailed presentation and interpretation of faunal samples from these sites.

Chapter 2 describes the environment and palaeoenvironment of the Great Northern Peninsula. Modern animal ecology is described in some detail as the Groswater Palaeoeskimo exploited a wide variety of species to a greater or lesser extent. A review of animal ecology is necessary for any discussion of the possible seasons during which the sites were occupied. In addition, the ecology of the animal populations, their aggregation size and availability, are factors which will influence decisions surrounding hunting strategy, and possible transport and processing of species for consumption.

Chapter 3 reviews Groswater Palaeoeskimo research and places it within the context of Newfoundland and Labrador prehistory. This will include a discussion of Groswater Palaeoeskimo culture history, chronology, material culture, dwelling features and settlement and subsistence interpretation. Phillip's Garden West and Phillip's Garden East are described, including specific information on site function, material culture, features and stratigraphy. A presentation of site descriptions provides the details of the occupations into which a study of faunal remains must be placed in order to make a holistic interpretation of the nature of Groswater Palaeoeskimo culture at the sites.

Chapter 4 introduces the faunal samples from Phillip's Garden West and Phillip's

Garden East and presents the methods employed in the analysis. This begins with a description of the species exploited, and an examination of their relative abundance. Methods of quantification are explicitly stated to ensure that results are clearly understood. The samples from Phillip's Garden West are compared in order to recognize any differences in exploitation at the site over time. In an inter-site comparison, samples from Phillip's Garden West are compared to Phillip's Garden East. In addition, the seasons during which the sites were occupied are presented and compared both between sites and within the site of Phillip's Garden West.

Chapter 5 presents the analysis of body part frequency of the seal bones which overwhelmingly dominate the assemblages at both sites. Numerous factors can influence the relative frequency of elements in an assemblage, both natural destructive processes and human treatment of animal parts. These factors are evaluated for each of the samples and again intra-site and inter-site comparisons are presented.

Body part frequency of seals is compared to meat utility indices to understand to what extent transport of meat to and from the sites may have contributed to the configuration of elements observed. In addition, based on the assumption that denser bones will survive the destructive forces of the environment better than less dense bones, the frequency of seal body parts is compared to the relative density of seal bones in an effort to explore to what extent differential preservation of bone may have contributed to the character of the seal bone assemblage. Differences are recognized between samples and an interpretation is offered that considers numerous lines of evidence. These include

the meat utility data and the relative density of the elements, as well as site information such as site location, features and artifact types. Finally, species ecology and ethnoarchaeological evidence all aid in the interpretation of seal body part representation on the sites.

As part of this faunal research, each of the seal elements is examined for cut marks. These mostly tiny slices are the perceivable remains of the activity of disarticulating the seal carcass. Chapter 6 presents a review of the location, type and frequency of these marks on the seal bones from each of the samples. It is hoped that by presenting these data it will be possible to recognize cross-cultural patterns in the butchering marks and their location, and that these data can be used in comparative research.

The results of this thesis have yielded insights into the settlement and subsistence practices of the Groswater Palaeoeskimo people in northwestern Newfoundland. While it is confirmed that sealing was the dominate subsistence activity at the two sites, a number of other species appear in the samples. There are aspects of the relative frequency of seal body parts that suggest seals were treated differently at the two sites. There is an absence of cranial elements from the Phillip's Garden West faunal samples that are contemporary with the Phillip's Garden East samples. This suggests some differences in the processing of seal at the two sites. The nature of the Groswater Palaeoeskimo occupations at Phillip's Garden West and Phillip's Garden East are explored in light of these discoveries.

CHAPTER 2
ENVIRONMENTAL CONTEXT AND RESOURCES

> Our high leuels of Land are adorned with Woods, both faire and seemely to behold, and greene all Winter. Within Land there are Plaines innumerable, many of them containing many thousand Acres, very pleasant to see to, and well furnished with Ponds, Brookes and Riuers, very plentifull of sundry sorts of fish, besides store of Deere, and other beasts that yeeld both food and furre (Edward Wynne, 1622 in Cell 1982).

2.1 Introduction

The Port au Choix region is rich in food resources which have sustained human populations for thousands of years. The following chapter presents the environmental context in which the Groswater Palaeoeskimo lived. As a hunting and gathering people, the Groswater Palaeoeskimo exploited resources directly from their environment. In order to understand the settlement and subsistence patterns of these people it is necessary to appreciate the environment in which they lived and the constraints and opportunities it provided as resources appeared and disappeared from the region. The availability of resources throughout the year, and throughout the region must have partially dictated the movement of the Groswater Palaeoeskimo and the types of activities in which they participated. Some features of the palaeo-environment are known; however, it is difficult to describe the Great Northern Peninsula and Strait of Belle Isle during this period with great precision. Likewise, the range of faunal and floral resources available for exploitation cannot be described with complete confidence. Nevertheless, a general

discussion of the ecology is a necessary component in understanding the context in which the Groswater Palaeoeskimo lived.

2.2 Modern Climate and Vegetation

The modern climate of the Great Northern Peninsula is influenced by both the cold Labrador current which flows south from the Arctic, and the prevailing northwest winds. As a result, winters are long and cold, while summers are short and cool. Mean maximum and minimum winter temperatures range from -10.3°C to -3.0° C, and in summer from 11.2°C to 17.5°C (Banfield 1981). Mean annual precipitation on the Great Northern Peninsula is 1500 mm, with measurable precipitation on the coast occurring on 150-175 days per year (Banfield 1981: 111).

Vegetation in the Port au Choix region falls within two ecological zones, the Strait of Belle Isle Ecoregion, and to a lesser extent, the Great Northern Peninsula forest ecoregion (Damman 1983). The Port au Choix region has tundra characteristics with wind-blown and stunted occasional forest, and barren coasts. The tree species here include spruce (*Picea sp.*), fir (*Abies sp.*), birch (*Betula sp.*), and shrubs include alder (*Alnus sp.*), and willow (*Salix sp.*) (Damman 1983). Peatlands are common throughout the region. Edible berries are abundant and include bakeapple (*Rubus chamaemorus*), blueberry (*Vaccinium angustifolium*), partridgeberry (*Vaccinium vitus-idaea*), crowberry (*Empetrum nigrum*), and crackerberry (*Cornus canadensis*) to name a few.

2.3 Palaeo-environment

The Groswater Palaeoeskimo (ca. 2800-1750 BP) in the Port au Choix region lived in an environment that was colder, wetter, and less predictable than today. The following section reviews the palaeo-environment beginning with a general regional perspective, to a more geographically specific look at the Port au Choix region. The study of pollen cores from various sites around the island and Labrador has allowed the creation of a profile of the environment since deglaciation. From this work it is possible to glimpse the climate and flora that would have existed when the Groswater Palaeoeskimo occupied the region.

Palaeobotanical reconstructions are conducted by identifying pollen from peat or lacustrine sediments, and along with radiocarbon dates, a time line of environmental conditions is constructed (Macpherson 1981). Macpherson (1981) reviews the data from a number of researchers to describe climate change in Newfoundland during the Holocene. The appearance and relative abundance of particular plant species in the Newfoundland environment indicates relative increases in temperature and precipitation. For instance, as the climate warms sedge and shrub species which are generally tundra inhabitants are replaced by alders, then boreal trees. This can be seen, for example, in the broad vegetation sequence for central Labrador (Jordan 1975). After the retreat of glaciers (ca. 9000 BP) from coastal Labrador, the ground was colonized by sedge-shrub and lichen-heath tundra. This was followed by an interval from 7200-6500 BP during which alder thickets appeared within the tundra. Coniferous trees, starting with the balsam fir, spread

from west to east between 6000-5000 BP. A few centuries later spruce appeared. While this research is based in Labrador, the configuration of plant colonies will be an indication of relative temperature and precipitation for any region.

In an analysis of lake sediment cores from southeastern Labrador, Lamb (1980) describes three pollen assemblage zones. The first, dating from 10,500 to 9000 BP is characterized by birch and willow, the second dating from 9000 to 5000 BP by alder-fir-spruce, and finally, the third dating from 5000 BP to the present is characterized by spruce. Lamb notes that the spruce pollen influx reached a maximum at 4000 BP, and declined substantially after 2500 BP. The vegetation during this time becomes more open as indicated by plants such as Ericaceae and Sphagnum. This relatively sudden decline after 2500 BP indicates an environmental shift to cooler, wetter conditions.

Research by McAndrew and Davies (1978) supports the suggestion of a climatic deterioration on the Great Northern Peninsula after 2500 BP. McAndrew and Davies studied pollen profiles from samples at the L'Anse aux Meadows site on the northern tip of the Great Northern Peninsula. Their results indicate that starting about 3000 BP there were several episodes when the climate deteriorated, followed by periods of amelioration. They note that a cooling episode took place between 2500 and 2000 BP. Their study shows that for the L'Anse aux Meadows region at this time there is a progressive decrease in the appearance of spruce (*Picea*) and balsam (*Abies*), with an increase in shrubs. These changes are interpreted as a reaction to climatic cooling.

A recent synthesis of Holocene lake sediment pollen records (Macpherson 1995)

supports the growing evidence of a cooling period during the Groswater Palaeoeskimo occupation of the Port au Choix region. Pollen records for Stove Pond, near Port au Choix, show a sudden decline in birch and poplar, a slow decline in spruce, with an associated increase in sphagnum.

Based on the results of pollen records, the implications for differences in resource availability is difficult to appreciate fully. It can be assumed that there was less forest cover during this time. Forest dwelling animal species are likely to have been less available than they are today. This would have included some avian species, and perhaps small fur-bearers. Patterns of movement of animals that use the forest for part of the year, such as caribou, may have been slightly different. Perhaps they would have had to travel further south to inhabit forested regions. However, because the Long Range Mountains would have encompassed a number of zones depending on elevation and distance from the coast, it is possible that the forest was thinner, and pushed further back toward the mountains.

While ice conditions would have been strongly influenced by changes in climate, it is difficult to predict the configuration of past ice formation. It is possible that during periods of cooling, ice formed around the Mecatina region of the Quebec Lower North Shore on a more consistent basis than it does today (Figure 1.2). Ice conditions would have been of enormous importance to the Groswater Palaeoeskimo at Phillip's Garden East and Phillip's Garden West, since the availability of the harp seal, a mainstay in the Groswater Palaeoeskimo diet at these sites, is dependant upon the presence of firm pack

ice.

LeBlanc (1996) provides an excellent review of present ice conditions in the study area. She (1996) points out that the pattern of ice formation and retreat is generally the same from year to year, with a fluctuation in timing of a few weeks. Ice begins to form by the middle of January in the Strait of Belle Isle, and extends into the Gulf of St. Lawrence. Meanwhile ice that has been forming in the Gulf of St. Lawrence and around Prince Edward Island meets this encroaching ice from the Straits to form a large mass of close pack ice. This is achieved by mid-February and continues until late March. By late March ice retreats first from the western Gulf of St. Lawrence. While the Strait of Belle Isle and the northwest coast of Newfoundland remain choked with ice, a channel begins to open along the southwest coast of the island by late April. Simultaneously, ice begins to retreat in an eastward direction along the coast of the Quebec North Shore and Labrador. The remaining ice island in the Straits is pushed south and west where it eventually melts by June.

2.4 Resource Availability

A wide range of potential species could have been available for consumption by the Groswater Palaeoeskimo, and any discussion of all the possibilities would be an unnecessarily large undertaking. While reference will be made to a range of species, the habitat and behaviour of only those species identified in this thesis is described in detail (See Chapter 4). Data on the ecology of modern species is all that is available.

Consequently, it must be understood that conditions in the past may have made any of these species more or less accessible.

2.5 Avian Resources

A wide range of bird species was available for exploitation by the Groswater Palaeoeskimo. Apart from the huge colonies of nesting murres and razorbills, a variety of freshwater ducks, geese, gulls, loons, and ptarmigan were present in the region.

Of the family Anatidae (swans, geese, and ducks), a number of speices would have been available on the Great Northern Peninsula. Today many of these are casual visitors to Newfoundland and Labrador. These include the tundra swan (*Cygnus columbianus*), the brant (*Branta bernicla*), and the snow goose (*Chen caerulescens*) (Godfrey 1966). The snow goose is a casual visitor to Labrador and Newfoundland during migration. It breeds in the high Arctic, migrating south in late October usually in a southwesterly direction. The snow goose winters in Canada only in British Columbia. More frequent is the Canada goose (*Branta canadensis*), which breeds over a huge ecological range, including treeless and forested country, coastal plains and mountains. Its breeding range includes southern Labrador and Newfoundland (Godfrey 1966:48). It nests on the ground near water, although nests are sometimes located in trees. It is present in Newfoundland during the summer, and may be seen along the coast in the spring and fall (Threlfall 1983:477).

A number of saltwater and freshwater birds would have been available on the

Great Northern Peninsula. These include ducks such as mallard, black duck, pintail, teal, canvasback (very rare today), ring-necked, harlequin duck, wood duck, goldeneye, and alcids such as murres, dovekie, gulls, and razorbill (Tuck 1967; Godfrey 1966). A number of these species were found at both Phillip's Garden East and Phillip's Garden West. These include both king and common eider (*Somateria spectabilis* and *S. mollisima*), common merganser *(Mergus merganser*), scoter (*Melanitta sp.*), common murre (*Uria aagle)* and thick-billed murre (*Uria lomvia)*, black guillemot (*Cepphus grylle)*, razorbill (*Alca torda)*, and dovekie (*Alle alle*).

The breeding range of the common eider includes much of coastal Newfoundland, Labrador and the Quebec North Shore. It is known to breed on islands off the Great Northern Peninsula in St. John Bay, as well as the northeast coast (Threlfall 1983:478; John Wells, Memorial University of Newfoundland pers. com. 2001). These birds are frequent summer residents along the coast of Labrador, and will remain in the area during the winter if ice conditions allow. The common eider nests in rock-sheltered situations, or in depressions among low vegetation, often in colonies (Godfrey 1966:75). The common eider inhabits low-lying rocky coasts and rock islands, although it is occasionally spotted around fresh water near the coast. Its winter range includes the Atlantic coast from the Arctic to the northeast United States.

Compared to the common eider, the king eider is less marine in its nesting habits, preferring to nest near fresh water, or on flat tundra some distance from water. Its breeding range is generally farther north than the common eider, being strictly Arctic, and

does not include Newfoundland and Labrador (Godfrey 1966). King eider would have been available for exploitation during the spring and fall migrations off the coast of Port au Choix. The king eider winters in open water off Newfoundland and Labrador and thus it would have been available in the Port au Choix region before the formation of pack ice. In the spring, large numbers of eiders migrate north through the Strait of Belle Isle, from about late April to late May with a peak around the middle of May. Today king eider are a small portion of this population, (less than one percent), but may have been more abundant in the past (John Wells, pers. com. 2001).

The common and red-breasted mergansers are two species of the genus *Mergus* found in the Port au Choix region. The common merganser breeds in southern Quebec, Labrador, and Newfoundland during the warm season, and remains offshore during the winter (Godfrey 1966; Threlfall 1983). This species nests in tree cavities, as well as holes in the ground, and in bushes and rock piles (Godfrey 1966:83). The red-breasted merganser has the same basic breeding and wintering range as the common merganser. Open water is a requirement of this species for winter habitation; therefore it is unlikely that mergansers were exploited during the winter in Strait of Belle Isle. It is more likely that this bird was exploited during the warmer months (John Wells pers. com.).

The white-winged, black and surf scoter are salt water coastal birds that are available in the study area during the spring, although there is little evidence of breeding here (Godfrey 1966; Threlfall 1983). These birds spend their winters in open water along the coasts of Newfoundland and the Gulf of St. Lawrence. Scoter species are most likely

to be present during the spring and fall migrations, as they are rarely here in the summer (Godfrey 1966). The white-winged scoter is the most likely to have been in the Straits region, and was most likely exploited in the spring or fall.

The dovekie is a species with a breeding range that is almost entirely restricted to the high Arctic marine zone (Nettleship and Birkhead 1985). It winters in open water off the coast of Newfoundland and Labrador. This would exclude the Strait of Belle Isle and western Great Northern Peninsula region where winter pack ice would not allow the dovekie access to open water. However in some years they occasionally use small openings in the ice along the shore during the early winter. Today the dovekie is very common on the Great Northern Peninsula, almost exclusively in the fall before the ice moves south (John Wells pers. com.).

The guillemot is a marine species that nests in small colonies, or in single pairs along the rocky coasts throughout Newfoundland, Labrador, and the Gulf of St. Lawrence (Nettleship and Birkhead 1985; Godfrey 1966). It nests in crevices, cliff faces and rocky rubble in the spring/summer, and spends winters offshore in open water. It would have disappeared from the Port au Choix area in the late fall and not reappeared again until the recession of the pack ice in the spring.

The common murre is a strictly marine species that inhabits the Arctic and sub-Arctic Atlantic coast, including Newfoundland, Labrador, and the Gulf of St. Lawrence (Nettleship and Birkhead 1985). It nests in often large colonies on sea cliffs along the coast, or on rocky islands (Godfrey 1966). Some colonies have been known to exceed

one million individuals closely concentrated on the breeding grounds (Threlfall 1983). Winters are spent in open water offshore, from approximately 10 kilometres offshore, to the continental shelf. This species was most likely exploited during the nesting season in spring/summer.

The thick-billed murre is primarily a high Arctic species, with smaller numbers breeding in Atlantic Canada, in areas that are influenced by the Labrador Current (Threlfall 1983:489). Breeding colonies exist in Labrador, eastern Newfoundland, and the Gulf of St. Lawrence (Nettleship and Birkhead 1985). Like the common murre, the thick-billed murre winters offshore, and would likely have been exploited during the spring/summer.

The razorbill breeds throughout the coasts of the north Atlantic, including the Strait of Belle Isle. The colonies of Atlantic Canada are relatively small and scattered, with the bulk of the population centered in southern Labrador (Nettleship and Birkhead 1985). The razorbill nests in colonies on sea cliffs, along coasts in rocky burrows, and on islands. It inhabits the shore region during the nesting season, while winters are spent offshore in open water. In the Port au Choix region, the razorbill could have been taken during spring/summer nesting season, or less likely, in open water during the fall before the advance of pack ice.

Numerous gull species would have been available for exploitation by the Groswater Palaeoeskimo. The bones of a number of large gulls (*Larus sp.)* were recovered. Some of the larger species include the great black-backed gull (*Larus marinus*), the herring gull (*L. argentatus*), and possibly the glaucous gull (*L.*

hyperboreus). Although not found in the material from Phillip's Garden West and Phillip's Garden East, other smaller gulls would also have been available for exploitation. They include the ring-billed gull (*Larus delawarensis*), the kittiwake (*Rissa tridactyla*), and the ivory gull (*Pagophila eburnea*). Species such as the herring gull and great black-backed gulls would have been available year round in the region, while the ring-billed gull and kittiwake would have been a summer visitor. The ivory gull is a winter resident in the region.

Both willow ptarmigan (*Lagopus lagopus*) and rock ptarmigan (*Lagopus mutus)* contributed to the diet of the Groswater Palaeoeskimo living in the Port au Choix region. The willow and rock ptarmigan are present year round; however the rock ptarmigan occurs mainly on higher ground on the Long Range Plateau (Godfrey 1966; John Wells, pers. com. 2001). The nests of both species are usually on the ground among grasses and leaves.

The bald eagle (*Haliaeetus leucocephalus*) is available year round on this coast (Godfrey 1966). However, it was probably most easily taken during the nesting season in the spring and summer. It nests in both trees and on high coastal cliffs.

2.6 Marine and Freshwater Resources

Despite the fact that numerous species of fish could have provided sustenance to the Groswater Palaeoeskimo, only cod (*Gadus morhua*) bones were recognized from the samples in this research. Nevertheless, other species, unrecognized because of poor

preservation or the fragmentary nature of the material could have been exploited. These include Atlantic salmon (*Salmo salar),* brook trout (*Salvelinus fontinalis),* and the American eel (*Anguilla rostrata*) (Scott and Crossman 1973). Purely saltwater species that would have been available include Arctic char (*Salvelinus alpinus*), capelin (*Mallotus villosus*), and Atlantic halibut (*Hippoglossus hippoglossus*) which comes into shallow water during the summer on the west coast of Newfoundland (Templeman 1966:87). Capelin are an offshore species that makes its way to shore for spawning during the early summer. This spawning period lasts for four to six weeks during which these smelt-sized fish can be gathered in huge numbers directly off the beach (Carscadden 1981). Herring (*Clupea harengus*) is another inshore fish found off the coast of western Newfoundland and Labrador, especially during the spring spawning period (Templeman 1966:91). American mackerel (*Scomber scombrus*) are a moderately warm-water species that may have been present on the west coast, although as conditions were colder than present, it is possible that they may not have been available (Templeman 1966: 93).

The Atlantic cod is a seasonal visitor to the shallow waters around Port au Choix. They occur in depths from 5 metres in inshore regions, to 600 metres in the offshore (Lear 1989). During the winter they live in the warmer lower levels, in deep offshore locations of greater than 100 fathoms (1 fathom = 6 feet). During the spring the Atlantic cod rise closer to the surface to depths of less than 10 fathoms, and follow the spawning capelin toward shore (Templeman 1966). They remain in the warmer upper levels into the early summer until temperatures rise, and the cod move offshore and into deeper levels once

more (Templeman 1966: 41). It is likely that cod would have been most easily exploited during the spring and early summer.

2.7 Terrestrial Mammals

There are thirteen mammal species native to Newfoundland. In addition to these, one, the Newfoundland timber wolf, is now extinct, and the polar bear and Arctic fox are infrequent seasonal visitors (Dobbs 1983). A number of terrestrial mammals would have been available for exploitation by the Groswater Palaeoeskimo in the Port au Choix region. The amount of recovered material suggests that although terrestrial species were not a large part of the diet at Phillip's Garden West and Phillip's Garden East, there was a fair variety present. These include caribou (*Rangifer tarandus*), black bear (*Ursus americanus*), wolf (*Canis lupus*), beaver (*Castor canadensis*), and red fox (*Vulpes vulpes*). Other possible species that could have been exploited include, polar bear (*Ursus maritimus*), Arctic fox (*Alopex lagopus*), marten (*Martes americana*), otter (*Lontra canadensis*), lynx (*Lynx lynx*), ermine (*Mustela erminea*) and hare (*Lepus arcticus*).

The only Artiodactyl native to Newfoundland is the woodland caribou (*Rangifer tarandus*). The variety here on the island is considered one of the largest in the genus, and is said to be more migratory than other woodland species, with three regional groups (Cameron 1958). There is a northern group, inhabiting the region from Howley and Birchy Lake to the Long Range Mountains (Figure 2.1). The main herd is located in the central and southern regions of the island, while the third is a non-migratory group on the

Avalon Peninsula on the east coast of Newfoundland (Cameron 1958:104). The fall migration, which is often triggered by heavy snowfall in the highlands, begins in October and continues into November, when herds congregate in the open lowlands for mating (Bergerud 1983). On the Great Northern Peninsula the herd closest to Port au Choix is referred to as the Cloud River Herd. In late August these caribou move toward the coast and northward to the Cloud River area (Earl Pilgrim, Retired wildlife officer pers. com. 2001). During the winter, small groups of between four and forty animals move constantly over the barrens, foraging under the snow and in blow-outs for the reindeer lichen and sedges that make up their diet (Northcott 1974). Their winter range would include the Point Riche and Port au Choix peninsulas. Indeed, in the winter of 2000 a small group of caribou over-wintered on the Point Riche Peninsula, some of them staying in the area into June (Renouf, pers. com. 2001). In the spring, the caribou begin their migration toward their calving grounds on the ridges and plateaux of the interior (Northcott 1974). Pilgrim (pers. com. 2001) reports that the spring migration takes the caribou into the back country on high plateaus at the upper end of Chambers Pond in the area of upper Cloud River south to Soufflets River. It is on this plateau region in spring that calving takes place. Once summer arrives, caribou are reported to move to the shaded sides of hills where snow has not yet melted, and flies are not as bothersome (Cameron 1958:105). Present-day hunters in the Port Saunders area, south of Port au Choix, travel inland for more than 30 km. to the Mount Bluie area to intercept the migrating herds (Cameron 1958 :105).

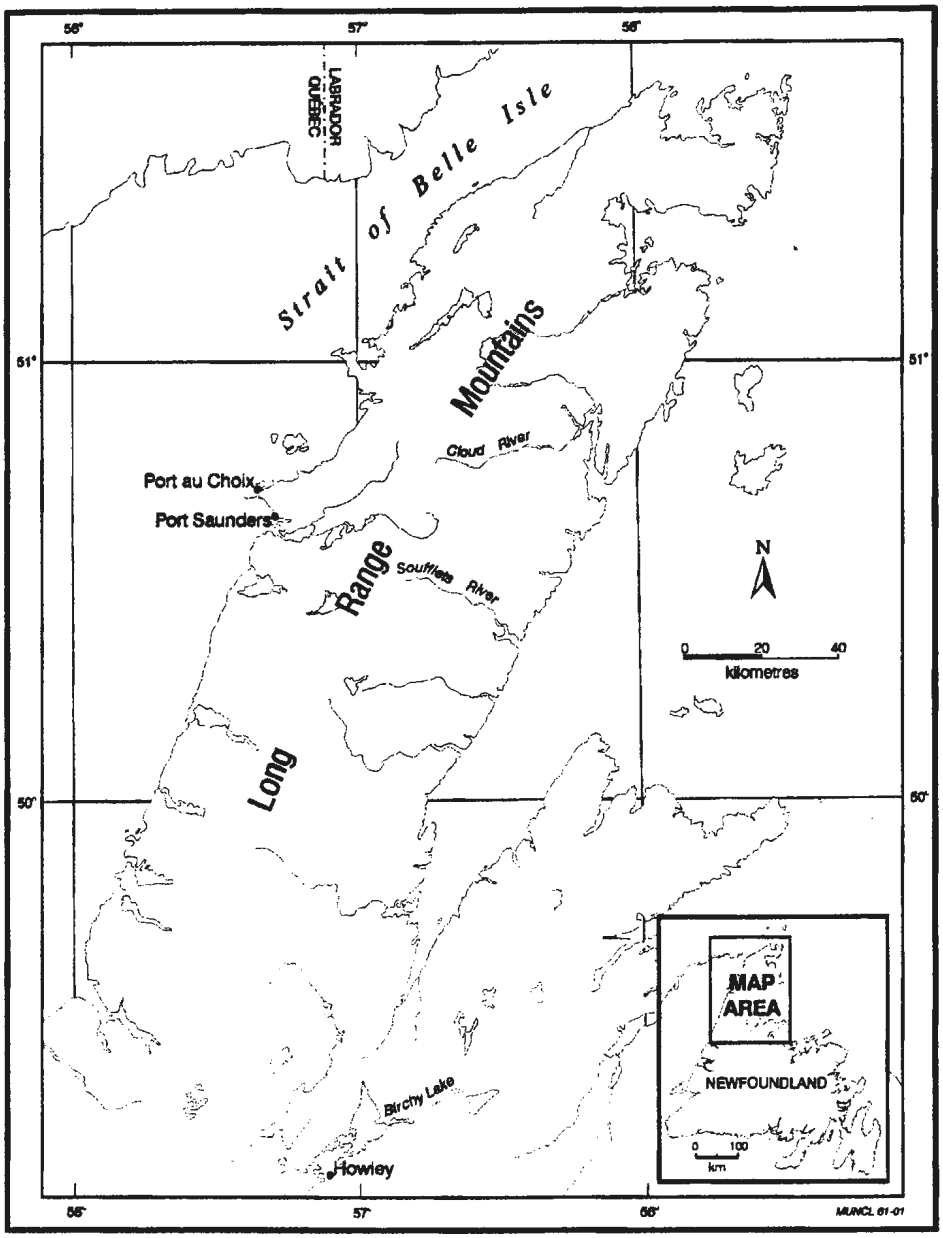


Figure 2.1 **Caribou Habitation Range on the Great Northern Peninsula.**

Prehistoric hunters may have had to move inland to exploit caribou during the late spring and summer, or wait for them to migrate toward the coast in winter. However, over-hunting in the last few hundred years has severely depleted the stocks making it difficult to predict the location of herds thousands of years ago.

The only member of the Ursidae family to regularly inhabit the island of Newfoundland is the black bear (*Ursus americanus*). The Newfoundland black bear tends to be substantially larger than its mainland cousins (Day 1993:47). This large, solitary omnivore prefers heavily wooded areas, but occasionally ventures into open areas to feed (Northcott 1974). For instance, Dodds (1983) notes that black bears spend from mid-summer to fall feeding on berries in open or burned-over barrens. Black bears enter a period of winter dormancy in dens around the month of December (Northcott 1974). During the winter females give birth, emerging from the den in late March or April. They would be most available for exploitation from the spring to the late fall.

The Newfoundland wolf (*Canis lupus beothucus*) is thought to be a variant of the tundra wolf complex rather than the timber wolves of southern Canada (Cameron 1958; Maunder 1991). It became extinct on the island about the mid 19th century. Assuming the Newfoundland wolf behaved in a similar fashion to other Canis lupus, it would have been a year-round inhabitant that showed little preference for specialized habitats. Like the grey wolf, it is conceivable that this animal lived, hunted and established dens as a pack (Forsyth 1985).

Beaver are distributed throughout Newfoundland along waterways where there are

plenty of suitable trees. Although beaver use a variety of trees for lodge construction, including black spruce, aspen, birch and alder, they are dependent on aspen for food. Cameron (1958:78) suggests that the general scarcity of abundant aspen may explain the apparent high frequency of movement of the beaver in Newfoundland. As conditions were cooler in the past, and aspen would have been less plentiful than today, it is possible that beaver populations on the Great Northern Peninsula were smaller.

The red fox (*Vulpes vulpes*) is another terrestrial species exploited by the Groswater Palaeoeskimo. It would have been available throughout the island in a variety of habitats, preferring a mixed cover in settled country (Northcott 1974). Breeding takes place in February, and pups are born during the spring. Cameron (1958:92) reports that foxes raise their young on the upland barrens during the spring. Although the fox could have been hunted at any time during the year, it would have been most desirable during the winter when its coat is at its thickest.

2.8 Marine Mammals

The Port au Choix region is particularly rich in sea mammals. Indeed, it was certainly the availability of huge harp seal (*Phoca groenlandicus*) populations that drew prehistoric peoples to this region. In terms of scale, species migrations of this magnitude are rare on earth, comparable only to the great migrations of millions of animals on the east African plains. The harp seal was by far the most important resource to the Groswater Palaeoeskimo economy at Port au Choix. Nevertheless, other seals, including

bearded seal (*Erignathus barbatus*), grey seal (*Halichoerus grypus*), hooded seal (*Cystorphora cristata*), harbour seal (*Phoca vitulina*) and ringed seal (*Phoca hispida*) were also available for exploitation. In addition, whale and porpoise species, as well as walrus were present along the shores of the Great Northern Peninsula. Of these latter three families, only whale of unknown genus was recovered in this research. The following section reviews the biology of the sea mammal species in the Strait of Belle Isle.

The North Atlantic Arctic and sub-Arctic is home to three stocks of harp seal, of which Newfoundland's harp population is the most highly migratory (Sergeant 1991). The Newfoundland stock is divided into two sub-stocks based on whelping locations, one whelping in the Gulf of St. Lawrence, near the Magdalen Islands, referred to as the Gulf herd, and the other whelping off the northeast coast of Newfoundland, known as the Front herd (Sergeant 1991; Bowen 1989).

Sergeant (1991) suggests that the Gulf herd has a northern variant, a small sub-stock that whelps in the northern Gulf of St. Lawrence area, referred to as the Mecatina Patch. Little is known about the size or reliability of this patch forming, but Sergeant (1991:42) estimates that, although quite variable, it could have been very large, with as many as 20,000 to 35,000 pups. He documents sightings of large numbers of harp seals on ice southwest of Point Riche (Sergeant 1991: 41). Indeed, Stenson et al. (1995) report a census of pups on this patch in 1990 as 4,400, and in 1994, 57,600.

All Newfoundland harp seal stocks spend summers in the Arctic, reaching as far north as Jones and Lancaster Sounds in the Canadian Arctic, and Thule in northwestern

Greenland (Bowen 1989:3). Migration south begins in the fall just ahead of the new Arctic ice formation. This migration involves all adult and most juvenile animals, leaving a few immature seals behind to spend winter in the Arctic. Their southward journey takes the harp seals along the east and west coasts of Baffin Island, and through the Hudson Strait toward coastal Labrador. The harp reach the Strait of Belle Isle by mid December (Bowen 1989: 3). Here the stock splits into sub-stocks, as about one third of the population moves through the Strait of Belle Isle toward the Gulf of St. Lawrence, and the Mecatina area of the Quebec Lower North Shore, and the rest move south down the northeast coast of Newfoundland. It is the two Gulf stocks that would have been available to Groswater Palaeoeskimo hunters at Port au Choix.

By January and February the Gulf herd is widely dispersed, moving south in and out of the bays and inlets of Labrador. During this period harps feed intensely in order to build reserves for the whelping period when feeding will cease. Modern and historical period accounts mention that at this time harp seal are easily taken in nets close to shore (Sergeant 1991; Trudel 1978). By the first week of March the pregnant females haul out on the ice to give birth. It is essential that the pack ice be adequately thick and stable for the successful whelping of pups. Until they are weaned pups are unable to swim. For this reason whelping does not take place close to the edge of the ice field, but toward the center where ice is thickest (Sergeant 1991). The adult females remain for approximately 12 days nursing their young, after which they abandon their offspring (Bowen 1989). Before leaving the whelping grounds, females mate with adult males that have been

congregating in the area in large herds. Beginning in early April, adult harps haul out on the stable pack ice again to begin a period of moulting that lasts about four weeks.

After this process, the harps begin their northward migration to their summer feeding grounds in the Arctic. Sergeant notes that young harp seals are solitary travelers in the spring, and leave the Gulf after adults leave. Young seals tagged in the Gulf are frequently taken in the Strait of Belle Isle as late as early June (Sergeant 1991:85).

LeBlanc (1996) collected information about seal abundance in particular regions of the Strait of Belle Isle from personal communications with biologists and local fishers. She determined that for the most part, harp seals hug the Quebec and Labrador sides of the Strait of Belle Isle during their southward journey in early winter, and return north in the spring along the coast of the Great Northern Peninsula. She points out that a fall seal hunt on the Great Northern Peninsula is rare, and usually an opportunistic event when an occasional animal appears (LeBlanc 1996:27). She goes on to state that two factors affect the availability of the harp seal herds in the region. They are the sometimes variable nature of ice conditions, and the distribution of seal food sources.

LeBlanc (1996) argues that harp seals were most likely hunted from the Port au Choix region during their spring migration north from the Gulf of St. Lawrence. Because whelping, breeding and moulting prior to the spring migration would have been concentrated many miles from shore on the pack ice, it is unlikely that hunters would have sought these animals under such dangerous conditions (LeBlanc 1996:28). She notes that part of the reason harps would have traveled north along the Great Northern Peninsula

was the availability of prey. The underwater physiography of this area allows for the proliferation of a variety of animals preyed upon by harp seal. The steepness of these underwater slopes creates an upwelling resulting in a highly productive marine zone and an abundance of shrimp. These places of upwelling can be some distance offshore, or in the case of the Point Riche Peninsula, very close to shore. The harp seals concentrate their feeding in these areas, exploiting the shrimp, capelin and cod. The Point Riche Peninsula would have been, and continues to be, an optimal location for the exploitation of these species.

The bearded seal is a large Arctic mammal (up to 300 kg) that is found along the shores of the Port au Choix region during the spring (Northcott and Phillips 1976; Forsyth 1985). Usually a solitary species, the bearded seal will congregate in the summer on gravel beaches, and during whelping which takes place on pack ice in April and May (Maxwell et al. 1967). The bearded seal prefers shallow coastal waters, feeding near the sea floor on crab, shrimp and various fish (Forsyth 1985). It winters in open water, moving south into the Gulf of St. Lawrence from the Arctic. It would have been easiest to hunt this species during the spring and summer.

The grey seal is a sub-Arctic and temperate species that occasionally travels north to the study area in spring (Beck 1983a:3). The breeding season for this species begins in December and lasts until early February. Breeding takes place on the drifting ice of Northumberland Strait and St. George's Bay between Nova Scotia and Prince Edward, and on land on Sable Island. Females will wean their young about two weeks after they

are born. By mid February the adult females will mate and leave the breeding grounds (Beck 1983a). During the spring there is a general dispersal of the herd. By March the young will begin feeding at sea or moving inshore toward Nova Scotia, southern Newfoundland, Labrador via the Strait of Belle Isle as far as Nain, and the northeastern United States. Adults remain at sea until May when they moult. They are generally inshore fishers; however they are known to travel to shallow offshore fishing banks (Beck 1983a:4). Grey seals would have been available in the Port au Choix region during the spring and summer.

The hooded seal has a very similar pattern of whelping and breeding to the harp and grey seals. Like harp seals, the whelping patches are on large ice fields in the Gulf of St. Lawrence, off southern Labrador, and off the northeast coast of Newfoundland (Sergeant 1985). Whelping takes place during the second half of March in either loose concentrations or isolated families on firm pack ice. The young are nursed for a very short time, from about four to eight days (Sergeant 1985; Lavigne and Kovacs 1988). The females mate after weaning the pups, and immediately head out to sea. Hooded seals feed in deep water on halibut, spiny redfish, and squid (Sergeant 1985: 4). This species travels huge distances; tagged pups from the Gulf of St. Lawrence were located around Greenland from one to six years after tagging (Sergeant 1985:2). After leaving the pack ice in spring the young usually head north. Because these species tend to be deep water feeders their presence in the Gulf of St. Lawrence is limited to the period around whelping and breeding (Sergeant 1985), thus it is likely that they were available in the Port au Choix

region while on the move to or from the whelping ground in late winter and early spring.

The harbour seal is widely distributed along the coast of Newfoundland, Labrador and Quebec. This species prefers quiet bays and inlets, frequently entering brackish waters around estuaries, and indeed sometimes venturing into fresh water (Beck 1983b). Their diet reflects their inshore habitat, and includes herring, squid and flounder. The young are born on land during May and June, and nursed for about one month. Like the other seal species mentioned above, the harbour seal breeds immediately after pups are weaned. Although this species is non-migratory, harbour seals do travel a wide range from the breeding grounds on islands in the Gulf of St. Lawrence. Northcott and Phillips (1976) report that prior to 1925 harbour seals were common on beaches in the Port au Choix region during the spring through to the fall, where they could be hunted with ease.

Although ringed seals are very rare in the Port au Choix region today, being Arctic dwellers, a cooler climate in the past may have extended this species' range to include this region. Ringed seals give birth to pups in the spring from mid-March to mid-May in dens constructed on pack ice (Maxwell et al. 1967). The habitat of this species includes the land-fast ice or the solid ice cover present in the Arctic Ocean, especially where it occurs in bays and estuaries (Forsyth 1985). These animals are a traditional food of Arctic peoples today, as they have been for thousands of years. They are usually harvested singly by hunters who harpoon them when they emerge in breathing holes in the ice (Balikci 1970).

Although a range of whale species passes along the coast of the Great Northern

Peninsula, only the remains of small whales were recovered in the faunal samples from Phillip's Garden East and Phillip's Garden West. The most likely species of small whales exploited here are the Atlantic pilot whale (*Globicephala melaena*), and the minke whale (*Balaenoptera acutorostrata*). The pilot whale feeds on inshore squid populations, and can be seen during the spring and summer. The larger minke whale inhabits the inshore where it feeds on herring, capelin, and other small fishes (Templeman 1966). Both species are frequent visitors to the coast of the Great Northern Peninsula during the late spring, and early summer.

2.9 Chapter Summary

This chapter introduced the ecological context in which the Groswater Palaeoeskimo lived. Information on past climatic conditions and animal species was reviewed in order to understand the resource opportunities and constraints facing these people in their subsistence and settlement choices. Greater emphasis was given to the behaviour of species whose bones were actually recovered in this research as these will form the basis of a discussion of Groswater Palaeoeskimo economic activity at Phillip's Garden West and Phillip's Garden East. The next chapter introduces the Groswater Palaeoeskimo culture as it is presently understood.

CHAPTER 3
THE GROSWATER PALAEOESKIMO

When archaeologists visit an ancient rivermouth camp, a hilltop lookout, or a hunting station perched on a gravel terrace above the coast, the surface they tread is the same one on which the Palaeo-Eskimo people lived thousands of years before. The local scenery has not changed over the intervening centuries. The archaeologist needs little imagination to picture the appearance of the ancient settlement or to guess why the people picked this location in which to live (McGhee 1996:7).

3.1 Introduction

This chapter introduces the Groswater Palaeoeskimo culture, placing it within the context of prehistoric occupation in Newfoundland and Labrador, and describes the material culture, house features and settlement and subsistence information to date. This general account will be followed by a description of the sites of Phillip's Garden East and Phillip's Garden West.

While numerous Groswater Palaeoeskimo sites have been located and excavated in the province, very little zooarchaeological evidence has been examined to understand the settlement and subsistence patterns of these people. Only a list of animals exploited, with imprecise remarks about relative frequency of species have been reported from the few sites yielding faunal remains. Nevertheless, the Groswater Palaeoeskimo have been interpreted as a highly mobile hunting and gathering people who exploited a variety of marine and terrestrial animals. This characterization is very general and based on limited evidence. The present faunal analysis offers the opportunity to more precisely describe the

settlement and subsistence of the Groswater Palaeoeskimo and explore the nature of their occupation in the Port au Choix region.

The material culture at Phillip's Garden West is not typical of that found at other Groswater Palaeoeskimo sites. This apparent variation has been described, and possible explanations explored (Renouf in press). The present research has the potential to provide greater empirical data on Groswater Palaeoeskimo settlement and subsistence, and on the particular nature of the occupation at Phillip's Garden West.

3.2 Groswater Palaeoeskimo

The Palaeoeskimo sequence in the eastern Arctic is divided into two broad phases, the Early and Late Palaeoeskimo periods. The Early Palaeoeskimo period is from ca. 4000 - 2500 BP, and the Late Palaeoeskimo period dates from 2500 - 500 BP (Maxwell 1985), the latter often referred to as the Dorset period. Groswater Palaeoeskimo is the term used to define the terminal Pre-Dorset period in Newfoundland, Labrador and parts of Quebec (Ramsden and Tuck 2001; Maxwell 1985). Elsewhere in the Arctic, cultures of the same period and similar artifact configurations are given different names: Independence II in northern Greenland and other places in the High Arctic, late Saqqaq, and Dorset I in southern Greenland, and Transitional on Ellesmere, Baffin, and Devon Islands (Renouf 1994). Occupation on the island of Newfoundland represents the southern most extent of this culture, and much of our understanding of the Groswater Palaeoeskimo culture comes from sites in Newfoundland.

Groswater Palaeoeskimo culture was first defined by Fitzhugh (1972) during surveys of the Groswater Bay region in central coastal Labrador. Here he excavated seven sites which allowed him to define a distinct cultural entity on the basis of artifact types, dates, which ranged from 2800 to 2200 BP, as well as site features and locations. Groswater Palaeoeskimo sites in Labrador now number over seventy, most of which are located between the Groswater Bay region of Hamilton Inlet to Nain, and along the Strait of Belle Isle, west to the Brador Bay area of Quebec.

The first Groswater Palaeoeskimo material uncovered in Newfoundland was found at Port au Choix (Harp 1964), the Norris Point site in Bonne Bay (Bishop 1974), and Cow Head on the Great Northern Peninsula (Tuck 1978) (Figure 3.1). Sites elsewhere in Newfoundland are spread along the coast covering almost all regions of the island. Dates for the Groswater Palaeoeskimo in all regions traditionally ranged from about 2800 - 2100 BP, but now it is known that the Groswater Palaeoeskimo were present in Newfoundland as late as 2000 - 1700 BP (Renouf 1994; Hartery and Rast 2001) (See Table 3.1).

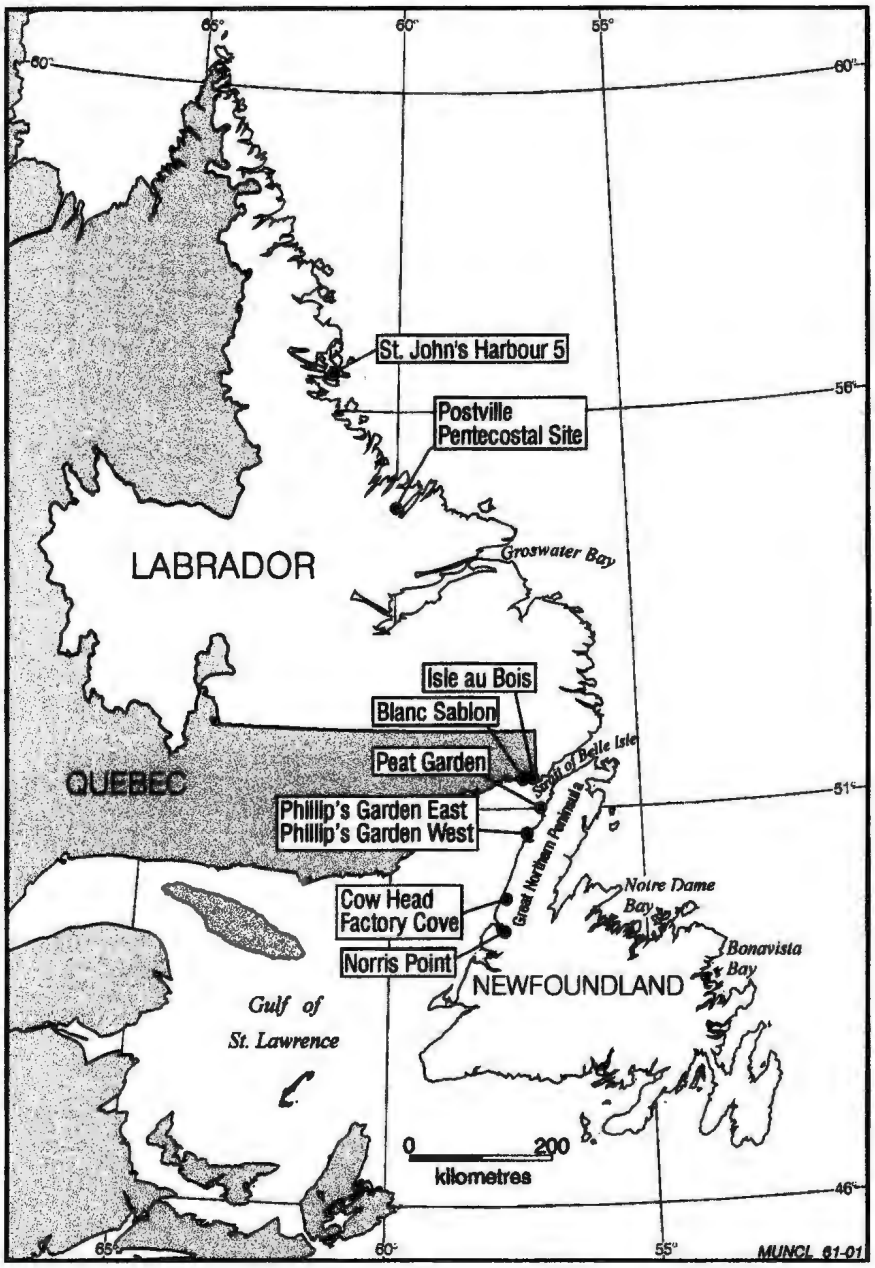


Figure 3.1 **Location of Groswater Palaeoeskimo Sites Mentioned in the Text**

Table 3.1 Groswater Palaeoeskimo Dates

Uncalibrated C14 Dates Years BP	Lab No.	Site Name & Region	Reference
2845 ± 120	DAL-274	Cow Head NW Nf	Tuck 1978
2805 ± 130	DAL-277	Cow Head NW Nf	Tuck 1978
2760 ± 90	Beta 23979	Phillip's Garden East NW Nf	Renouf 1994
2700 ± 140	Beta 4047	Factory Cove NW Nf	Auger 1985
2690 ± 140	GSC-1179	GbBn-2 Ticoralak 2 S Lab	Fitzhugh 1972
2660 ± 70	Beta 15375	Phillip's Garden East NW Nf	Renouf 1994
2570 ± 90	Beta 40350	EiBg-43a Blanc Sablon	Pintal 1994
2540 ± 160	Beta 49759	Phillip's Garden West NW Nf	Renouf 1994
2530 ± 280	UQ 413	Factory Cove NW Nf	Auger 1985
2460 ± 120	Beta 49761	Phillip's Garden West NW Nf	Renouf 1994
2430 ± 80	Beta 23004	Ile au Bois S Lab	Pintal 1994
2420 ± 60	Beta 19637	EiBg-43a Blanc Sablon S Lab	Pintal 1994
2420 ± 110	Beta 42971	Phillip's Garden East NW Nf	Renouf 1994
2400 ± 160	GSC-1314	GbBn-7 Ticoralak 5 S Lab	Fitzhugh 1972
2370 ± 160	Beta 19089	Phillip's Garden East NW Nf	Renouf 1994
2350 ± 100	Beta 42972	Phillip's Garden East NW Nf	Renouf 1994
2350 ± 90	Beta 50023	Phillip's Garden East NW Nf	Renouf 1994
2340 ± 100	Beta 49760	Phillip's Garden West NW Nf	Renouf 1994
2320 ± 100	Beta 19087	Phillip's Garden East NW Nf	Renouf 1994
2310 ± 90	Beta 42970	Phillip's Garden East NW Nf	Renouf 1994
2300 ± 150	UQ 1753	Ile au Bois S Lab	Pintal 1994
2270 ± 100	UQ 409	Factory Cove NW Nf	Auger 1985
2260 ± 70	Beta 50022	Phillip's Garden East NW Nf	Renouf 1994
2210 ± 40	Beta 142067	Peat Garden NW Nf	Hartery and Rast 2001
2200 ± 110	Beta 42973	Phillip's Garden West NW Nf	Renouf 1994
2190 ± 100	Beta 49756	Phillip's Garden West NW Nf	Renouf 1994
2120 ± 40	Beta 142066	Peat Garden NW Nf	Hartery and Rast 2001
2100 ± 60	Beta 4046	Factory Cove NW Nf	Auger 1985
2090 ± 70	Beta 49757	Phillip's Garden West NW Nf	Renouf 1994
2050 ± 70	Beta 110141	Peat Garden NW Nf	Hartery and Rast 2001
1960 ± 80	Beta 66438	Phillip's Garden West NW Nf	Renouf (1993)
1938 ± 65	Beta 2252	Peat Garden NW Nf	Hartery and Rast 2001
1753 ± 45	Beta 2253	Peat Garden NW Nf	Hartery and Rast 2001

Although few have been excavated, Groswater Palaeoeskimo house features show a fair degree of variability in form. Generally, houses tend to have ill-defined wall features

suggesting light construction. House features from Labrador are similar to earlier Palaeoeskimo forms in that they have central paving with mid-passage hearths constructed using stone slabs (Cox 1978). There are at least seven Labrador sites yielding dwellings (Anton, Museum of Newfoundland and Labrador pers. com. 2001). Unfortunately descriptions of most of these features are not available as they are unpublished. However information is available for two house features located at the Postville Pentecostal site in central coastal Labrador (Loring and Cox 1986), and one dwelling excavated at St. John's Harbour 5, near Nain (Anton, pers. com. 2001). At the Postville Pentecostal site both structures were approximately 5 m by 2 m, and defined by paving stones with central box hearths and alcoves (Loring and Cox 1986). In addition, Loring and Cox located several isolated box-hearths and mid-passage structures at this site. The dwelling at St. John's Harbour 5 has undefined walls and a double row of flat paving stones through the center. This mid-passage feature measured approximately 3 m and may be the only indication of the dwelling size. A hearth defined by charred wood and blubber occurred in the center of the mid-passage feature. Another hearth was located on the site, but may have been outside the dwelling (Anton, pers. com. 2001 Sergeant 1985).

In Newfoundland a number of house feature types have been identified from three sites. At Factory Cove, near Cow Head, Auger (1985) uncovered a number of possible house structures. These include a tent ring, a semi-subterranean structure, and a lean-to dwelling. The tent ring was a roughly square arrangement of stones measuring 4 m by 4 m. A semi-subterranean structure, measuring 4.4 m by 2.6 m, was similar to the one

found at the Postville Pentecostal site. It was outlined in stone and had a mid-passage hearth. The lean-to was roughly square, measuring 3 m by 2 m, and was made apparent by an outline of decomposed organic material, presumably wood (Auger 1985:46).

At Phillip's Garden East two house structures were excavated by Renouf (1987, 1991, 1992). One, a circular depression lacking any internal features may represent a Dorset intrusion on the site (Renouf, pers. com. 2001) The second house (Feature 12) was also roughly circular, approximately 5 m in diameter, and lacked any depression. This feature was thought to be a tent outlined by a small mound of refuse and fire-cracked rock (Renouf 1992, 1994). One house feature excavated by Renouf (1992) at Phillip's Garden West was interpreted as a circular tent structure. The house structure was approximately 3.5 m north-south, and 3.0 m east-west. It had five post holes and a centrally placed internal hearth feature. Each of the posts were evenly spaced around the structure, except at one location, which has been interpreted as the opening (Renouf 1992: 33). The opening is positioned in the southwest, away from the cold, prevailing northwest winds.

Groswater Palaeoeskimo material culture is characterized by box-based, plano-convex, side-notched endblades which are sometimes exquisitely made with precisely placed serration on the edges, and occasional surface grinding. Other stone tools include chipped and ground burin-like tools, circular, triangular, and ovate sideblades, rectangular, 'eared' scrapers, concave side-scrapers, a wide range of finely made bifaces, a variety of chipped and ground axes and adzes, and numerous microblades (Plate 3.1).

Plate 3.1 **Groswater Palaeoeskimo Tool Assemblage**

Most of the stone tool industry is manufactured from high quality cherts, much of it originating in the Cow Head area and Cape Mugford in Labrador (Fitzhugh 1980; Loring and Cox 1986; LeBlanc 1996). Other raw material sources include Ramah chert and quartz crystal. Small oval or rectangular soapstone lamps are occasionally found, and there is a low proportion of true burins (Kennett 1991; Renouf 1994). Organic tools have been found at Groswater Palaeoeskimo sites in the Port au Choix region, at Phillip's Garden East and Phillip's Garden West (Renouf 1994). These tools include numerous styles of harpoon heads (Plate 3.2), hafts for sideblades, and various other implements such as needle fragments, and awls.

Plate 3.2 **Bone Harpoon Heads from Phillip's Garden East**

For the most part interpretations of the settlement and subsistence patterns of the Groswater Palaeoeskimo have been based on extrapolations from site location and resource availability. LeBlanc (1996) describes this trend as simply hypothetical regional patterns that lack any supporting evidence. These interpretations were made when no faunal remains were available for testing. Since that time, sites on the Great Northern Peninsula have yielded faunal remains that have provided evidence of specific subsistence behaviour. In addition, LeBlanc offers a model of settlement and subsistence for the Groswater Palaeoeskimo based on seasonal availability of important game and the dispersal of lithic raw material throughout Newfoundland, Labrador and the Quebec Lower North Shore. While decades of excavations throughout Quebec and Newfoundland and Labrador have led to the emergence of a pattern of highly mobile people following a foraging strategy oriented toward the coastal region, these interpretations are very general, and do not reflect the range of activities that can take place at sites of this culture.

The first discussions of Groswater Palaeoeskimo settlement and subsistence were focused on sites in Labrador. From his work in Labrador, Fitzhugh (1972) developed a settlement and subsistence typology to characterize the economies of the various prehistoric cultures. Based on his excavations, he described the Groswater Palaeoeskimo as having what he called a modified maritime orientation with almost exclusive habitation on the coast and year-round exploitation of marine fauna. Fitzhugh postulated some exploitation of near interior species especially caribou, birds and fish. He suggests an

inner bay, outer coastal settlement and subsistence pattern, with summers at the outer locations, near the mouth of Groswater Bay, and winters in sheltered areas of the narrows (Fitzhugh 1972:161). Fitzhugh did not recover any faunal evidence to support his interpretation, basing his suggestions solely on the location of sites.

A later, alternative interpretation suggested that the Groswater Palaeoeskimo used the interior to a greater extent then postulated by Fitzhugh (Loring and Cox 1986; Tuck 1988). Based on their excavations of the Postville Pentecostal site in Kaipokak Bay, Loring and Cox (1986) suggested greater use of the interior. They suggested winter settlements in deep bays, fall and spring camps on inner islands, and summer on coastal location in inner bay areas. This interpretation was based on the location of this site at the coast, while offering easy access to the interior. However, again there were no faunal remains found at this site to support their interpretation. Indeed, Loring and Cox found no sites on islands in the area to substantiate their interpretation.

Good faunal preservation on Groswater Palaeoeskimo sites in Newfoundland has allowed greater precision in the interpretation of settlement and subsistence patterns on the island. There is general agreement that the Groswater Palaeoeskimo followed a strongly maritime pattern of resource exploitation, but there are a number of terrestrial species in their faunal assemblages that support the suggestion of a mixed economy. These include various birds, caribou, hare, fox, and beaver (Auger 1985; Kennett 1991).

At Factory Cove, Auger (1985) suggested a year round occupation, based on faunal data and the variety of dwelling types at the site. The faunal analysis alone,

however, only supported a late winter and spring occupation, with a few species extending the occupation into June (Stewart 1979; Cumbaa 1985). Stewart (1979) identified 81 bones from a total sample of 591, and Cumbaa (1985) identified 477 bones from a sample of 1200.

Faunal analysis revealed a similar late winter, spring occupation for the Groswater Palaeoeskimo site of Phillip's Garden East (Renouf 1994; Kennett 1991). Primary focus at Phillip's Garden East was on spring seal hunting, with some representation from terrestrial species including beaver, red fox, arctic fox, marten, and caribou. The faunal sample identified at this site was very large; of the 30,000 bone fragments examined, 8422 were identified beyond class.

Results of analysis of faunal remains from the Groswater Palaeoeskimo site, Peat Garden, at Bird Cove on the Great Northern Peninsula shows a similar pattern to other west coast sites. Of the identifiable fragments (n= 955) examined by Murray (n.d.), small seal *Phoca sp.* make up the vast majority of the collection, comprising 88.5% of the assemblage identifiable to taxonomic order. Of these, it is likely that the majority are harp and harbour seal as the site is south of the usual range for ringed seal (Murray n.d.). Other identifiable mammal fragments include caribou, beaver, black bear, and lynx. A number of fish and bird bones were identified to class, but the lack of a comparative collection of faunal material prohibited a more precise identification. Murray suggested the season of occupation at this site can be tentatively placed during the late spring/early summer. The harp seal migration in the area, as well as the young caribou individuals in

the faunal sample points to this period, but Murray stresses that further analysis may alter this interpretation.

Sites of the Groswater Palaeoeskimo culture tend to be fairly small, with few house structures, these tending to be rather lightly constructed compared to later Dorset houses in the same region. Coupled with faunal assemblages that reflect some mixture, the Groswater Palaeoeskimo people have been interpreted as a mobile hunting and gathering people, who focus most of their economy on coastal resources.

Renouf (in press) described a variety of evidence, including faunal data that characterizes the Groswater Palaeoeskimo as a mobile culture. She pointed out that sites tend to be small in all regions. There are apparently no large semi-permanent sites like those of the later Dorset period. House structures tend to be few at sites, and not very substantial in construction. With little exception, artifact styles are very homogeneous and raw material distribution is widespread. This suggests a great deal of movement and communication throughout the Groswater Palaeoeskimo geographical range.

In the Burgeo area Rast (1999) located six Groswater Palaeoeskimo sites, concluding that the Groswater Palaeoeskimo in this area, like groups on the Great Northern Peninsula and Strait of Belle Isle followed a generalist subsistence strategy, focusing largely on marine species, with some use of interior resources. Located on the mainland and inner islands, the six sites Rast found offered excellent locations from which to monitor marine and terrestrial game. In addition, from these locations, the Groswater Palaeoeskimo had immediate access to deep and shallow water resources.

LeBlanc (1996) proposed a model of mobility for the Groswater Palaeoeskimo in the Gulf of St. Lawrence based on regional lithic and faunal resource distribution. She suggested that the acquisition of Cow Head cherts and the harp seal migrations in this region form the basis for Groswater Palaeoeskimo mobility. She pointed out that for the most part, harp seal are available on the Labrador side of the Strait of Belle Isle during the fall when they are feeding close to shore in the numerous small bays that line this coast. Because the location of good seal hunting can not be easily predicted on this side of the Strait, Groswater Palaeoeskimo settlements are not always in the same bays, resulting in a configuration of smaller sites scattered along the coast. Conversely the coast along the Point Riche and Port au Choix peninsulas is extremely rich in the species preyed upon by the harp seal. As a result, harp seal are very predictable spring visitors to the coast and sites on this side of the Strait are larger and show evidence of frequent reoccupation. The frequent use of Cow Head cherts, and the appearance of these lithics throughout Labrador lends support to her suggestion of a highly mobile pattern of seasonal movement.

3.3 The Study Area

The following section will introduce the two sites from which the data for this thesis are drawn. The sites of Phillip's Garden West and Phillip's Garden East were both excavated by Renouf during the 1980s and 1990s (Renouf 1985, 1986, 1990, 1991, 1992). They are both located on the north shore of the Point Riche Peninsula on Newfoundland's northwest coast (Figure 1.1, Plate 1.1). These sites are located on either

side of the large Middle Dorset site of Phillip's Garden. They are about a fifteen minute walk from one another, and both sites can be seen from the other. As mentioned earlier, both sites have a number of radiocarbon dates that overlap; however the earliest dates are from Phillip's Garden East, while the most recent dates are from Phillip's Garden West (Table 3.1 and Figure 3.2). While it is difficult to demonstrate contemporaneity with certainty, for instance the sites could have been occupied during different decades, the radiocarbon dates cannot suggest anything other than that the sites are contemporary.

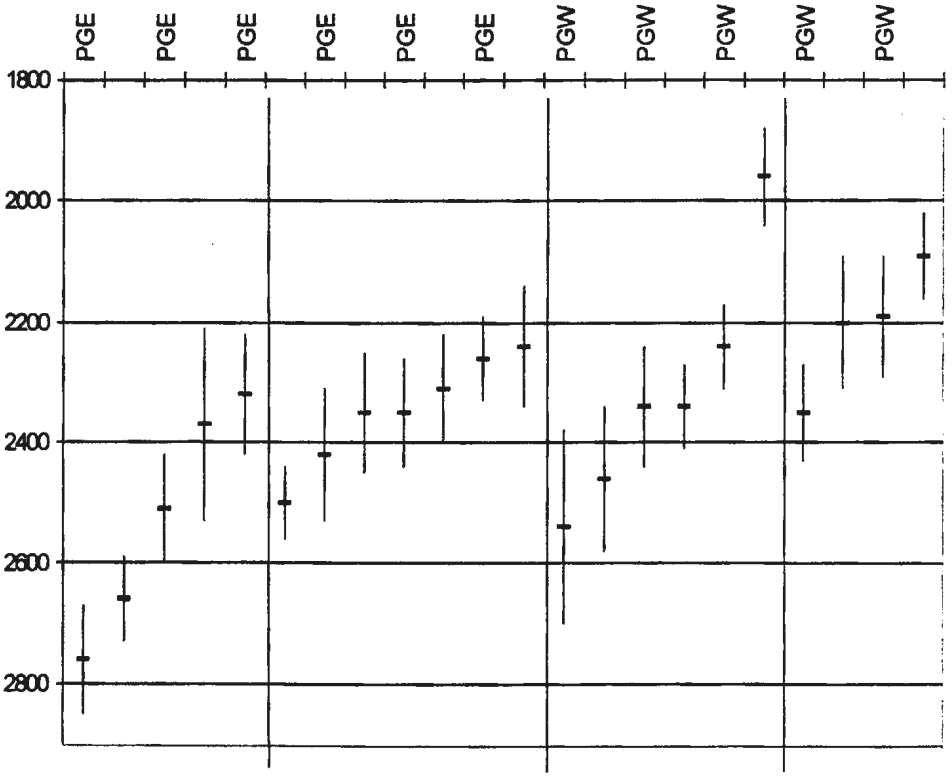


Figure 3.2 **Dates From Phillip's Garden West and Phillip's Garden East Showing Overlap (From Renouf in press)**

3.4 Phillip's Garden West

The Groswater Palaeoeskimo site at Phillip's Garden West was first located by Fitzhugh (1983). It was subsequently retested in 1984 and completely excavated by Renouf during the summers of 1990-1992 (Renouf 1985, 1991, 1992, 1993). The site sits upon a 13 m terrace and covers an area of approximately 500 m^2. The site has an upper terrace area which yielded a tent structure with an internal hearth, but relatively little debris (Plate 3.3). There were a number of hearths and possible hearths, presumably external, scattered throughout the upper terrace from which charcoal samples were taken for dating. The edge of the terrace drops sharply toward the beach, and it was on this hillside and lower terrace area that the bulk of the artifactual and faunal material was recovered (Plate 3.4). This area was clearly the midden deposit from the upper terrace occupation. Faunal preservation at this site is exceptional by any standard. The limestone bedrock of the Point Riche and Port au Choix peninsulas tends to neutralize the otherwise acid soils of the region. The high sand content in the soil provides good drainage, and the masses of bone in the midden all contribute to the excellent preservation seen in the faunal material from this site. Despite the mixing that would have taken place as faunal refuse was thrown over the hillside, the excavators were able to distinguish separate dumping episodes. Midden features often consisted of bone, fire-cracked rock and charcoal refuse, as well as flake and stone tool fragments. While most of the midden features appear to have been deposited from above, there is at least one feature that appears to have been a dumping episode from below (Renouf 1992). Dates for the site

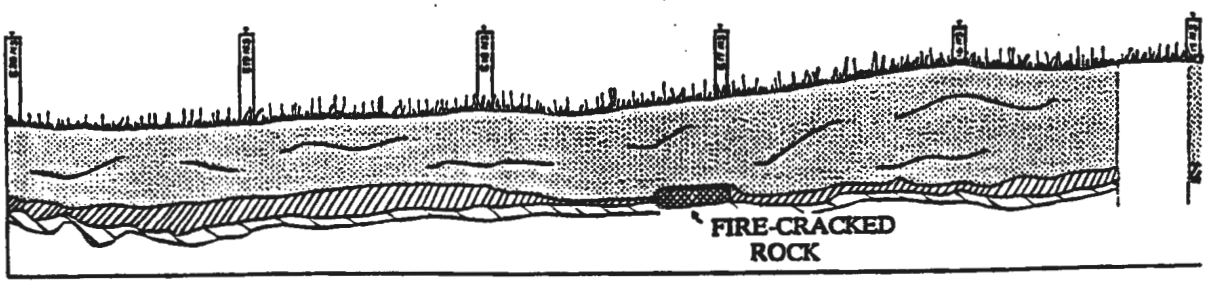
reveal an occupation spanning a 500 year period. The late date of 1960 BP is among the most recent recorded for the Groswater Palaeoeskimo culture at present (Table 3.1, Hartery and Rast 2001).

Plate 3.3 **The Upper Terrace at Phillip's Garden West Looking East Toward Phillip's Garden East**

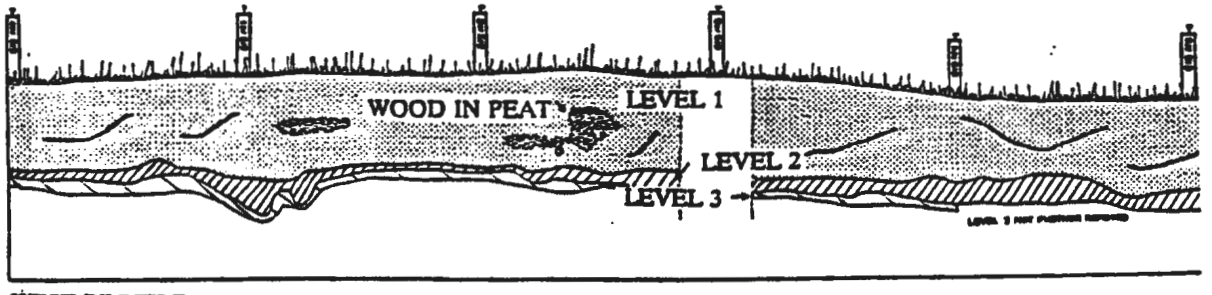
Plate 3.4 **View of the Hillside Midden at Phillip's Garden West**

Despite a certain amount of overlap, the distribution of uncalibrated dates on the site reveals that the upper terrace is a more recent occupation, and that material below on the lower terrace was, for the most part, deposited during an earlier time. Renouf (in press) refers to the earlier, or older area as PGW1, which is almost all of the hillside and lower terrace midden area. The more recent part of the site, or youngest area, is located on the level, upper terrace and is referred to as PGW2. It represents the most recent occupation at the site. Two bone midden features isolated on the lower terrace have young dates, presumably representing the most recent deposits of refuse over the hillside from above.

The stratigraphy on the upper terrace is relatively straightforward, with an upper peat Level 1 which covers a black cultural Level 2. Within Level 2 there are three lenses which occur at various locations. These are interpreted as relating to drainage conditions on the site. Level 3 is another cultural layer that is a paler interface before the sterile limestone beach Level 4 (Figure 3.3).



NORTH PROFILE



WEST PROFILE

Figure 3.3 Stratigraphy at Upper Terrace, Phillip's Garden West (From Renouf 1991)

Stratigraphy in the hillside midden is more complex (Figure 3.4). Level 1 is a thin sod layer overlaying the same black cultural Level 2. Below this is an Upper and Lower Level 3. The Upper Level 3 is a thin mostly sterile sand layer over the thicker Lower Level 3 which contains a great deal of cultural material. As on the terrace, Level 4 is sterile limestone beach cobble.

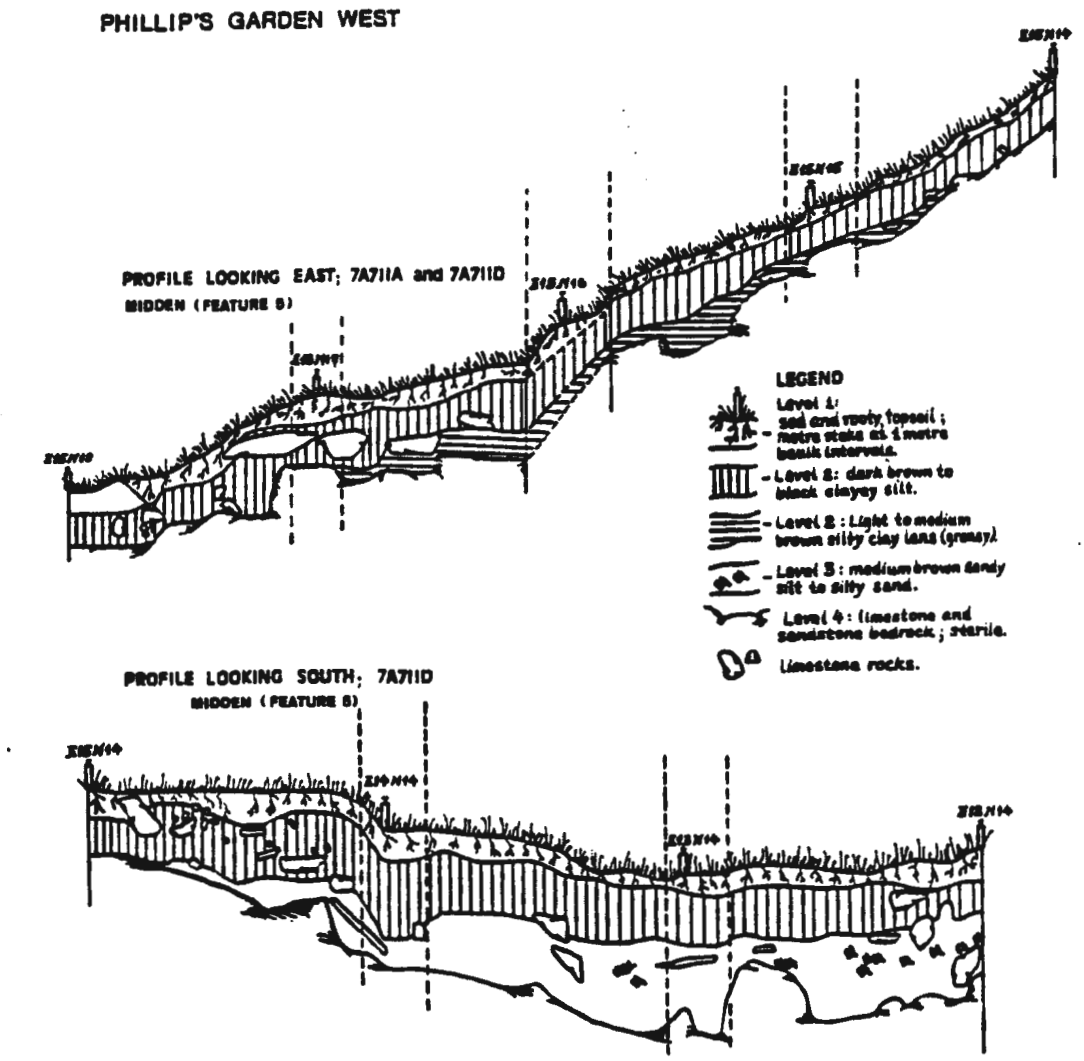


Figure 3.4 Stratigraphy at Hillside Midden, Phillip's Garden West (From Renouf 1993)

Based on the tent structure located at Phillip's Garden West, and the fact that the site sits on an exposed terrace, Renouf (1992, 1998) suggests that this site was occupied during seasons of warmer weather. Darlene Balkwill of the Canadian Museum of Nature conducted a preliminary identification of the faunal material as it was being excavated. She noted the presence of a variety of species including wolf, caribou, vole, fish and fox (Renouf 1993:10), some of which have not been recorded from other Groswater Palaeoeskimo sites. Balkwill's identifications are incorporated into the present study by kind permission.

3.5 Phillip's Garden East

Phillip's Garden East was discovered in 1984 by Renouf (1985) during a systematic survey of the Point Riche and Port au Choix peninsulas. The site sits upon a 12.5 m terrace and covers an area of approximately 1500 m^2 (Plate 3.5). A total of 127 m^2 was excavated during the seasons of 1984, 1986, 1990 and 1991. Like Phillip's Garden West, bone preservation at this site is excellent largely due to the limestone bedrock.

Plate 3.5 **Phillip's Garden East Looking Southwest Across the Dorset site of Phillip's Garden Toward Phillip's Garden West**

Stratigraphy in the northern portion of Phillip's Garden East shows some complexity due to reoccupation of the site (Renouf 1987). The top-most Level 1 consists of thick sterile peat. Below this is a thin black layer referred to as Level 2. Following this is a thin Level 3 consisting of a dark brownish-grey clay ranging in thickness from 1- 4 cm. Fewer artifacts were found in this level compared to Level 2; however greater amounts of faunal material were recovered. A Level 3A occurs sporadically throughout the site. It is darker than Level 3, but has the same soil type. Level 4 is a sterile beach sand and cobble layer found throughout the excavation area (Figure 3.5).

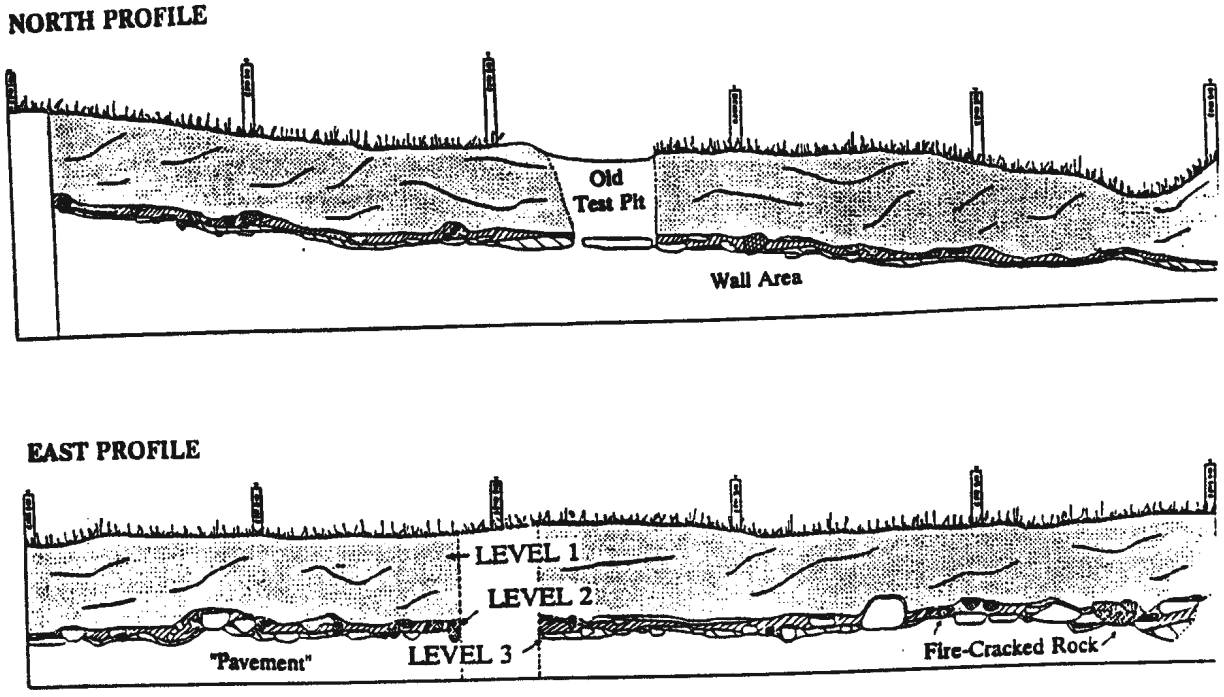


Figure 3.5 **Stratigraphy at Phillip's Garden East (From Renouf 1991)**

Stratigraphy in the southern portion of the site is less complex than in the north. Below the peat Level 1 is an Upper and Lower Level 2. Upper Level 2 yielded a few artifacts and a number of flake concentrations (Renouf 1991). Lower Level 2 is darker and more compact than the Upper Level 2. It has fire-cracked rock scattered throughout, and a number of artifacts. The underlying Level 3 is a clay-like level ranging in thickness from 1-7 cm. As opposed to Level 2 most of the organic material is deposited in Level 3, and fewer stone artifacts.

3.6 Present Research within the Context of Groswater Palaeoeskimo Studies

The present research fills a number of gaps in Groswater Palaeoeskimo research. No faunal remains have been identified at Phillip's Garden West, and while a large sample of faunal material has been identified from Phillip's Garden East, very little empirical interpretation of this data has been offered. The presentation of faunal material here includes empirical data on species abundance and seasonality, as well as data on the treatment of seals at Phillip's Garden West and Phillip's Garden East. The tool assemblage at Phillip's Garden West shows some significant variation from the typical form of Groswater Palaeoeskimo material culture. This variation has been well documented and some interpretation offered (Renouf in press; Ryan 1997). The present research has the potential to address issues relating to this unusual variant.

Renouf (in press) conducted lithic analysis to define the characteristics of this assemblage in relation to typical tool kits by comparing Phillip's Garden West material to

that found at Phillip's Garden East. In this work, Renouf took a number of measurements and recorded shape, raw material type, and the presence or absence of surface grinding, edge serration and basal attributes on a range of stone tools. She made a number of observations that metrically and non-metrically illustrated the unusual nature of the stone tool kit at Phillip's Garden West. The use of Ramah cherts and the choice of colourful varieties of cherts, and surface grinding and serration of some tools was much more frequent at Phillip's Garden West than at Phillip's Garden East. There was variation in the shape of many tool types. For instance, endblades were longer and thinner at Phillip's Garden West compared to Phillip's Garden East (Plate 3.6 and Plate 3.7).

Renouf suggested possible explanations for the apparent variability at this site, offering three plausible interpretations for the Phillip's Garden West variant. They are cultural, chronological and functional. She demonstrated that the assemblage represented a Groswater Palaeoeskimo occupation, and although dates at Phillip's Garden West are among the most recent for the culture, there is a significant amount of overlap with dates from Phillip's Garden East and other Groswater Palaeoeskimo sites (Table 3.1; Figure 3.2). Indeed, this overlap is more apparent when dates are calibrated (Renouf in press). Renouf suggested that the differences noted could be related to a difference in the function of the sites. Based on a preliminary glance at the faunal remains from Phillip's Garden West she suggested that subsistence activities and seasons of occupation tended to overlap with Phillip's Garden East. Renouf concluded that the variation witnessed at Phillip's Garden West may not be related to the mechanics of resource exploitation and processing,

but ritualized aspects of these activities.

The present research fills a number of gaps in Groswater Palaeoeskimo settlement and subsistence at Phillip's Garden West in particular and in the Port au Choix region in general. A determination of seasonality will be made for Phillip's Garden West and Phillip's Garden East in order to understand functional similarities and differences between the sites. In addition, any evidence for ritual activities as it relates to the faunal material will be explored. Much of the information on Groswater Palaeoeskimo settlement and subsistence is based on evidence of site location and models of optimal hunting and raw material strategies. Faunal evidence has offered details of the species exploited, but has not been explored in detail. An examination of three chronologically separated faunal samples from Phillip's Garden West will, for the first time, provide a picture of the subsistence behaviour of the site's inhabitants throughout the period of site occupation. A thorough examination of this evidence has the potential to inform about subsistence behaviour at the site, and offer clarification of current settlement and subsistence interpretations. Comparing these samples to the identified faunal remains from Phillip's Garden East offers the opportunity to explore the similarities and differences in the occupation of both sites.

Plate 3.6 **Typical Groswater Palaeoeskimo Tool Assemblage from Phillip's Garden East**

Plate 3.7 **Groswater Palaeoeskimo Tool Assemblage from Phillip's Garden West**

3.7 Chapter Summary

The preceding discussion introduced the Groswater Palaeoeskimo culture and the sites of Phillip's Garden West and Phillip's Garden East. The present research will contribute to a greater understanding of Groswater Palaeoeskimo economy as a whole, and in particular understand the nature of the unusual occupation at Phillip's Garden West. The next chapter will describe the faunal samples used in the present analysis, methods employed, species abundance, and a discussion of Groswater Palaeoeskimo hunting and fishing in the region.

CHAPTER 4
SPECIES ABUNDANCE AND SEASONALITY

> Zooarchaeology is a somewhat technical business with its own established procedures for identification, measurement and so on. The output of these procedures is *data* - often quantitative and numerical, in which we search for patterns. Having found patterns, we seek to use them to reconstruct the behaviours that gave rise to them, and also the filtering or taphonomic factors that may obscure the link between the behaviour and the pattern (Rowley-Conwy 2000:ix)

4.1 Introduction

The first stage in understanding the settlement and subsistence patterns of the Groswater Palaeoeskimo at Phillip's Garden West is to document the species exploited. This involves the identification and presentation of the species exploited and an examination of their relative abundance. The faunal samples selected from this site come from dated features that span site occupation. It will thus be possible to recognize any change over time in the nature of exploitation. This aspect of the research is concerned with intra-site variability. A second aspect of this thesis is to compare the faunal assemblages at this site to those found at Phillip's Garden East.

This chapter introduces the faunal samples selected and the methods employed in the analysis. Data are presented and analyzed for species abundance and relative frequency. Methods of quantification are critically evaluated to ensure that results are understood in light of the shortcomings of these procedures. In addition, the seasons during which the sites were occupied are presented and compared.

A large sample of faunal material was examined from features located at Phillip's

Garden West and Phillip's Garden East (Renouf 1987,1991,1992,1993). Both sites were excavated by careful troweling and screening of back-dirt through 3 mm mesh screens. In addition, soil samples were taken for water sifting through 1.5 mm mesh screens (Renouf 1986, 1991).

4.2 The Study Sample: Phillip's Garden West

Three midden features from this site were selected for analysis as they represent separate dumping episodes and produced dates that span the entire occupation of the site. The study sample here comes from Features 18, 5A-5D, and 5E, chronologically from earliest to latest. The entire hillside midden at Phillip's Garden West is referred to as Feature 5 (Figure 4.1).

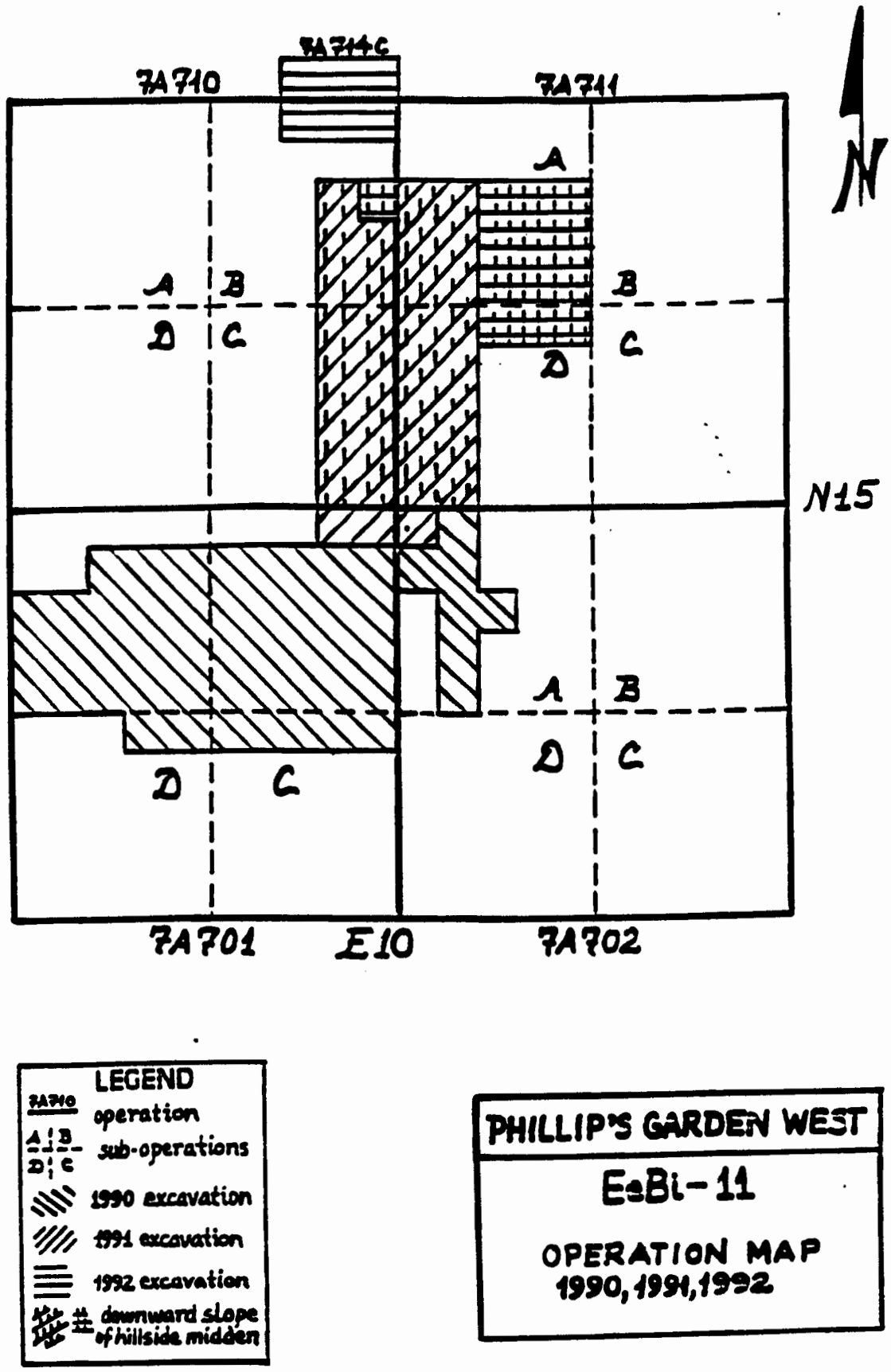


Figure 4.1 Site Plan of Phillips' Garden West (from Renouf 1993:4)

4.2.1 Feature 18

Feature 18 was a dense concentration of bone and flakes from Level 3 in the hillside midden (Renouf 1992). It extended over four metres in area 7A711A and ranged in thickness from 18-25 cm. Two charcoal samples returned dates of 2460 ± 120 BP and 2340 ± 100 BP (Table 3.1). The quantity of faunal material recovered was huge. For instance, fifteen large paper bags of bones were removed from two one-metre squares. Because of time constraints it was necessary to select a sample of the faunal remains for analysis. A total of 20,070 bone fragments was examined from this feature. Based on a conservative estimate of the total faunal material for Feature 18, the study sample represents approximately half the total.

4.2.2 Feature 5A-5D

Feature 5A-5D was initially designated as four separate subfeatures representing discrete midden deposits, but was subsequently grouped as one deposit (Renouf 1993). This feature was located in Level 3 of area 7A711A and ranged in thickness from 2-21 cm (Figure 4.1). A charcoal sample returned a date of 2240 ± 70 B.P (Table 3.1). Much of the faunal material from this feature was identified by Darlene Balkwill of the Canadian Museum of Nature. She examined a total of 2924 bone fragments and I analyzed 723, together generating a faunal sample of 3647 specimens.

4.2.3 Feature 5E

Feature 5E was a distinct dump consisting of a large concentration of bone found in Level 3 of area 7A711D (Renouf 1993) (Figure 4.1). Apart from the faunal remains, this feature yielded an unusual number of cores and core fragments. A charcoal sample taken from this feature generated a date of 1960 ± 80 B.P (Table 3.1). The entire faunal assemblage from this feature was examined, consisting of 3025 specimens.

4.3 The Study Sample: Phillip's Garden East

The Phillip's Garden East faunal material analyzed in this thesis is from excavations conducted in 1990 and 1991 (Renouf 1991, 1992). Apart from the identifications I have made from this site, Anne Rick, formerly of the Canadian Museum of Nature, identified much of the material. The faunal material comes from a number of features as well as bone concentrations around house Feature 12 (Figure 4.2). For the purpose of conducting an inter-site comparison with each sample from Philip's Garden West, the faunal remains from these Phillip's Garden East features are presented and analyzed as one sample consisting of 4255 bone specimens. I will present the features from which the samples were taken and discuss their provenience. The features have been interpreted as having different functions. A discussion will follow which argues that all the faunal material associated with the features can be interpreted as refuse deposits and not abandoned stored material.

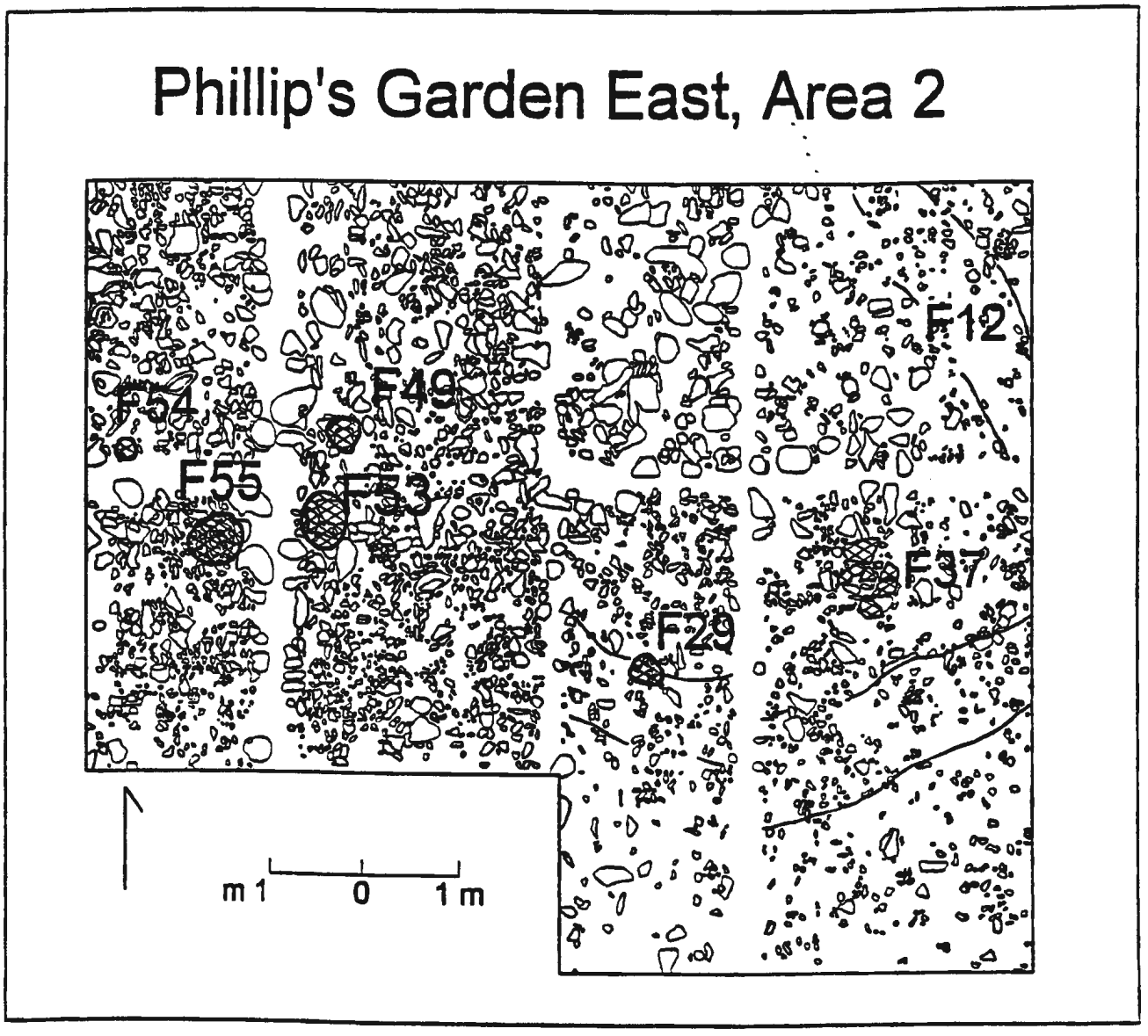


Figure 4.2 Site Plan of Phillip's Garden East

4.3.1 Feature 29

Feature 29 was a stone-lined pit inside the wall of house Feature 12. This roughly rectangular pit was oriented northeast to southeast, and had a maximum depth of 8 cm. Initially, it was thought to be a possible storage pit; however, refuse found adjacent to the feature was relatively ubiquitous, leading Renouf (1991:34) to suggest that this was likely a random arrangement of stones and material. Aside from faunal material, this feature yielded a number of artifacts, flakes, charcoal and fire-cracked rock. All faunal material from this feature was examined.

4.3.2 Feature 37

A sample of faunal material was examined from Feature 37, a small bone-filled pit located in the wall of house Feature 12. It was roughly oval in shape and measured 40 cm by 23 cm. The bone was surrounded by burned rock and a few artifacts (Renouf 1991:35). Half the faunal material from this feature was examined.

4.3.3 Feature 49

All the faunal material was examined from Feature 49. Feature 49 was a small irregularly shaped storage box measuring 23 cm by 28 cm, and 4-5 cm deep in Level 3 (Renouf 1992:8). Its base rested on the beach Level 4. The sides of the box consisted of rocks, with a large limestone slab capping the top. The contents of this shallow pit feature included only bone and charcoal.

4.3.4 Feature 53

The entire faunal sample from storage Feature 53 was analyzed. This feature was interpreted as a large storage unit west of house Feature 12. It measured 8 cm by 60 cm, and reached a maximum depth of 11.5 cm. The bones, charcoal, burned and unburned wood, and artefacts that filled this feature were found below capping stones (Renouf 1992). A charcoal sample from this feature returned a date of 2260 ± 70 B.P (Table 3.1).

4.3.5 Feature 54

All of the faunal material from Feature 54, a small circular concentration of bone was examined. This feature measured 15 cm in diameter, and 9.5 cm deep. It occurred in Level 3, west of house Feature 12 (Renouf 1992:8).

4.3.6 Feature 55

All the faunal material from Feature 55 was examined. This feature was interpreted as a storage pit in Level 3, measuring 58 cm by 30 cm (Renouf 1992). It consisted of bone, charcoal, a few artifacts, and fire-cracked rock. A charcoal sample collected here returned a date of 2500 ± 60 B.P (Table 3.1).

4.4 Quantification and Methodology

Methods for the examination and quantification of faunal material can vary greatly, making it difficult to compare results from different studies. It is therefore important to state research methods explicitly in order to evaluate results. Numerous methods of quantifying bone are used by analysts with varying degrees of precision. These methods cannot generate precisely accurate information on the subsistence and settlement strategies of past people. However, realizing the limitations of quantitative methods, and understanding what methods are appropriate to specific questions can generate useful settlement and subsistence information. The next section will introduce and critically evaluate the quantification methods used in this thesis.

The most basic method of quantification is the number of identifiable specimens (NISP) per taxon. A specimen is defined here as a whole or portion of an element (Reitz and Wing 1999:10). NISP is an observational unit that simply involves the tallying of the frequency of specimens (Lyman 1994:100). It is a descriptive means of organizing and presenting a bone assemblage. There are numerous criticisms to be made for the sole and inappropriate use of this technique. Ringrose (1993:126) illustrates the most obvious criticism when he points out that "NISP will count 125 specimens from one animal as being the same as one specimen from each of 125 animals". This example demonstrates the obvious problems in using this measurement to determine taxonomic abundance.

A number of additional criticisms of NISP demonstrate the problems of using this as a sole method of quantification. For instance, butchering patterns can affect the number

of identifiable specimens. Animals for which only part of the carcass is returned from the kill site may be poorly represented compared to others that are brought back whole (Grayson 1984). Variation in NISP counts from species to species may be a reflection of the fact that some animals are more easily identifiable than others, making studies of relative abundance of animals difficult. Klein (1980) points out that hippopotamus bones are easily recognizable, even to species, while bovids are more difficult to identify. Furthermore, animals have different total numbers of bones per individual. Ungulates, for instance, do not have the many phalanges of other animals; therefore they may not appear to be as well represented (Grayson 1984). Differential preservation can affect the relative abundance of particular bones (Lyman 1984, 1994). Some thinner bones such as scapulae and crania are more susceptible to post depositional destruction. Breakage of bones for consumption or tool making can lead to either an over- or under-representation of the actual bones on a site. For example, long bones are sometimes broken to extract marrow for consumption leaving numerous unidentifiable bone fragments, or possibly many identified fragments of the same bone. Conversely, some bones are quite dense, and not processed in any way, leading to an apparent over abundance.

Despite these criticisms, calculating NISP is not a useless exercise in quantification. It is a starting point for understanding an assemblage, and only becomes ineffective when it is used to answer questions for which it cannot contribute meaningful answers. Indeed, NISP counts are helpful as they allow future analysts raw data with which to generate various applications. NISP counts are provided in this thesis as a

starting point to present the faunal assemblages analyzed, and the frequency of the various elements.

Calculating the minimum number of individuals (MNI) is a method that allows some of the major problems of NISP to be addressed. However, this method must be understood in light of its inability to represent an assemblage as it existed in the past. Minimum number of individuals is most simply defined as the minimum number of animals that could have contributed to the faunal list compiled (Klein and Cruz-Uribe 1984:26). There are several methods for calculating this value. In most cases, bones for each taxa are grouped according to element and divided into the side of the animal from which they came. The highest number represented is the MNI. Considerations of age, sex, and size of the bones can influence the MNI count. For example, if humeri were the most frequent bone for a taxa, with 10 left and 4 right elements, the MNI based on side would be 10. This number changes if age is also considered. If the 4 right humeri were unfused, and the 10 left fused, the MNI for this taxa would become 14. It is therefore important for researchers to define what criteria they use in generating MNI.

The fragmented state of many specimens in the archaeological record can inflate the MNI count. Klein and Cruz-Uribe (1984:26) describe a procedure where fragmented elements are recorded with a numeric estimate of the fraction of the bone present (.5, .25, .75), summing the fractions in the end. Another procedure, which is used in this thesis, is to sum the most frequent zone apparent for each element type when calculating MNI. Table 4.1 presents a hypothetical sample of *Canis lupus* ulnae with the side and the zones

designated for portions of that element. It is assumed in this instance that the elements are from adult animals. The most frequent zone per side is the three zone 4s on the right elements. Although there are four right elements, two of them could have come from the same element, and thus an MNI of three is recorded. The MNI designation has taken fragmentation into account.

Table 4.1 Hypothetical Collection: Generating MNI Considering Side and Zonal Designation.

# of Fragments	Species	Element	Side	Zone
1	Canis lupus	ulna	L	1234
1	Canis lupus	ulna	L	123
1	Canis lupus	ulna	L	4
1	Canis lupus	ulna	R	1234
1	Canis lupus	ulna	R	1234
1	Canis lupus	ulna	R	12
1	Canis lupus	ulna	R	4

Reitz and Wing (1999:194) describe MNI criticism as a growth industry among zooarchaeologists. These criticisms are generally justified as MNI values tend to underestimate the numbers of animals on most sites. There is a lack of consensus on the method of calculation, making it difficult to compare results from numerous studies (Grayson 1984). Not all analysts take age into consideration when calculating MNI, and those that do may set criteria for age in different ways. For instance, some may call all unfused bone juvenile, while others may include partially fused bone in a juvenile category. Furthermore, different bones fuse at different ages, so a juvenile age class is not uniform.

Analysts take size into account in different ways, some using visual differences, while others take careful measurements to see differences. This leaves the possibility of a discrepancy in how analysts decide how much larger or smaller a bone must be compared to another before it is considered a second individual (Murray 1992:46).

Grayson (1978:55) points out that MNI counts tend to exaggerate the abundance of poorly represented, or rare taxa. For example, a single bone from one species will yield a MNI of one, while a species represented by numerous bones may also give a MNI of one. By ensuring sufficient sample size this problem can be alleviated to some extent. A final significant problem with MNIs is that they are not additive (Klein and Cruz-Uribe 1984:28). If a species sample contains three left distal radii, two right distal radii, and one left proximal humerus, the MNI is three. If a sample of the same species from a second stratigraphic level is represented by three left distal humeri, two right distal radii, and two left proximal radii, the MNI is also three. However, if these samples from the two stratigraphic levels were added together, the MNI would not be six, it would be four. The rather cumbersome task of calculating MNIs would have to be performed again.

The calculation of MNI in this thesis takes side, and fusion into consideration, but not sex or size of the element. Each specimen was examined for fusion rates and given a designation of fused, unfused, or partially fused when the fusion line between epiphysis and element was clearly visible. Consideration of fusion was done at the element level only. For instance, one unfused proximal tibia was not considered to be from the same individual as one fused proximal tibia. I did not suggest that three unfused scapula could

not come from the same individual as three fused femora, as fusion rates for elements in one individual differ. For each taxonomic designation, the most frequent zone of the most frequent element generated the MNI for that taxon. Once the side of the animal from which this element came was taken into consideration, differences in fusion rates for that element allowed for the possibility of increasing the MNI.

The identification of the faunal material for this thesis was accomplished using comparative collections at the Museum of Newfoundland and Labrador and the Canadian Museum of Nature. A number of levels of identification were made. The first level was to distinguish the element, as well as its side in appropriate cases. Second, an attempt was made to identify the element to the most precise taxonomic level possible. In many cases it was impossible to identify elements to the species level, and sometimes only family or class designation was possible. For instance, a large portion of the faunal samples from both Phillip's Garden West and Phillip's Garden East were identified to the seal family (*Phocidae*). Species-specific elements are rare among *Phocidae*. Particular locations on the auditory bulla, mandible, scapula, humerus, ulna and femur allow species identification, but there remains a great deal of overlap in the appearance of elements among species (Hodgetts 1999). In addition, apart from being similar to one another, phocids exhibit a great deal of variation within each species, adding to the difficulty in making a precise identification (Hodgetts 1999: 145). Thus, my identifications of phocids were often limited to the family level, with some narrowed down to two species, and only a few identified to single species. There were many tiny fragments of bone in each of the

samples that could only be given a class designation (e.g., mammal, fish, bird).

The third level of identification was to isolate the minimum number of elements that could account for the configuration of fragmentary specimens. This was accomplished, following Hodgetts (1999), by assigning a numeric zone designation to identifiable regions or landmarks on elements. On long bones these zones were often articular ends, but also included diagnostic areas on elements such as places of muscle attachment. The most frequent zone for each element provided the minimum number of elements present for each taxa. A zonal designation was given only when more than half of the zone was present. In addition to the zones, the portion (proximal or distal for instance) of the element was described.

4.5 Species Abundance, Hunting, and Seasonality at Phillip's Garden West

The following section presents and discusses the results of my identifications, and offers an interpretation of the seasons of occupation at Phillip's Garden West over time. Seasonality studies are one of the most common uses of faunal data. In most cases this simply involves noting the presence or absence of seasonally available species, and from this stating the seasons during which a site could have been occupied. Monks (1981) evaluates the means by which seasonal information is gathered and interpreted. His evaluation presents a number of issues that should be considered when conducting seasonality studies. He warns that it is simplistic to assume that if a seasonally available animal was discovered at a location (site), it necessarily means the site was occupied

during that season. Only the activity of acquiring the animal is directly related to season. Storage and transport of seasonally available food can, for example, obscure a seasonality estimation. In addition, processing activities, such as the drying of whole fish for the purpose of storage or transport off the site can remove seasonal indicators (Monks 1981:184). Finally, if a resource is available for six months, this does not mean that the site was occupied for the entire period. These considerations are incorporated into the interpretation of seasonality at Phillip's Garden West.

Tables 4.2, 4.4 and 4.6 present the species abundance at Phillip's Garden West. It is clear from these tables that seal species made up the bulk of the diet at this site throughout its history of occupation. Nevertheless, birds, fish, and terrestrial mammals enriched the diet of the Groswater Palaeoeskimo. The results of this analysis suggest an occupation at this site that occurred during the months of the spring and early summer. There are some indications of fall and winter, but for reasons to be stated, these are fairly weak.

4.5.1 Feature 18

Feature 18 at Phillip's Garden West exhibited a wide range of species in its assemblage, dominated by sea mammals, especially seal, with a variety of birds, some terrestrial mammal and fish. Of the avian species, some have a NISP of one, and those with higher NISPs are nonetheless assigned a MNI of one. It is possible that these birds died on the site naturally and are not associated with Groswater Palaeoeskimo

exploitation. However, since these elements come from rather rich midden deposits that include artifactual material, it is quite likely that these remains are in good cultural context. The most numerous bird species are those of the *Alcidae* family including dovekie, common and thick-billed murre, razorbill, and guillemot. Most of these birds are available during the warmer months of the spring and summer when they nest in huge numbers (see Table 4.3).

Table 4.2 Phillip's Garden West, Feature 18: Species Abundance by NISP and MNI.

Scientific Name	Common Name	NISP	MNI
FISH			
Gadus morhua	Atlantic Cod	29	6
BIRD			
Branta canadensis/ Chen caerulenscens	Canada Goose/ Snow Goose	3	1
Anas sp.		3	1
Somateria mollisima	Common Eider	1	1
Somateria spectabilis	King Eider	1	1
Melanitta sp.	Scoter	3	1
Mergus merganser	Merganser	3	1
Lagopus lagopus	Willow Ptarmigan	1	1
Lagopus mutus	Rock Ptarmigan	2	1
Larus sp.	Gulls (all large)	7	1
Uria sp. & Alca torda	Common and Thick-billed Murre,	37	5
Alle alle	Dovekie	4	1
Cepphus grylle	Black Guillemot	2	1
Haliaeetus leucocephalus	Bald Eagle	2	1
MAMMAL			
Castor canadensis	Beaver	6	1
Cetacea	Whale	1	1
Canis lupus	Wolf	5	1
Vulpes vulpes	Red Fox	4	1
Phocidae	Seal & Walrus	3980	24
Phoca sp.	Seal	9	5
Halichoerus grypus	Grey Seal	3	1
Phoca groenlandicus	Harp Seal	16	6
Erignathus barbatus	Bearded Seal	1	1

Cystophora cristata or Erignathus barbatus	Hooded or Bearded Seal	2	1
Phoca groenlandicus or Erignathus barbatus	Harp or Bearded Seal	1	1
Phoca groenlandicus or Halichoerus grypus	Harp or Grey Seal	3	1
Phoca groenlandicus or Phoca vitulina	Harp or Harbour Seal	2	1
Phoca groenlandicus or Phoca hispida	Harp or Ringed Seal	2	1
Erignathus barbatus or Halichoerus grypus	Bearded or Grey Seal	2	1
Phoca hispida or Phoca groenlandicus	Ringed or Harp Seal	1	1
Phoca hispida or Phoca vitulina	Ringed or Harbour Seal	2	1
Halichoerus grypus or Phoca groenlandicus	Grey or Harp Seal	1	1
Phoca vitulina or Phoca groenlandicus	Harbour or Harp Seal	1	1
Rangifer tarandus	Caribou	3	1
Total Specimens Identified Beyond Class		**4143**	
Unidentifiable Fish		231	
Unidentifiable Bird		175	
Unidentifiable Mammal		15532	
Total Specimens		**20081**	

Table 4.3 Seasonal Availability of Feature 18 Species.

	J	F	M	A	M	J	J	A	S	O	N	D
Atlantic cod			x	x	x	x						
Canada Goose				x	x	x	x	x		x	x	
Common Eider						x	x	x				
King Eider				x	x					x	x	
Scoter			x	x						x	x	
Merganser sp.					x	x	x	x				
Ptarmigan sp.	x	x	x	x	x	x	x	x	x	x	x	x
Gulls	x	x	x	x	x	x	x	x	x	x	x	x
Murres				x	x	x	x	x				
Razorbill				x	x	x	x	x				
Guillemot				x	x	x	x	x				
Dovekie		x*	x*							x	x	x
Bald Eagle	x	x	x	x	x	x	x	x	x	x	x	x
Beaver	x	x	x	x	x	x	x	x	x	x	x	x
Whale				x	x	x	x	x				
Canidae	x	x	x	x	x	x	x	x	x	x	x	x
Grey Seal			x	x	x							
Harp Seal	x*	x	x	x	x	x						x*
Harbour Seal			x	x	x	x	x	x	x	x	x	
Bearded Seal			x	x	x							

	J	F	M	A	M	J	J	A	S	O	N	D
Hooded Seal		x	x	x	x							
Caribou			x	x	x				x	x	x	x

* Possible but not likely to be available in the area

In the spring it would be possible to harvest both eggs and birds in the Port au Choix region, while in the early summer, young birds could be preyed upon. Indeed, one of the razorbill elements identified in this research was from a young individual, thus strengthening the suggestion of a spring/early summer hunt. The exception is the dovekie which is common during the fall, and found only occasionally early in the spring in ice-free channels along the shore (Nettleship and Birkhead 1985). The king eider is available during the spring and fall, while the common eider is strictly a summer visitor to the region (Godfrey 1966:75). Common and red-breasted mergansers are available during the spring only, while the scoter species are present during the spring and fall (Threllfall 1983). The species available year-round include gull species, rock and willow ptarmigan, and the bald eagle. The gull elements could only be identified to the genus level, but it was noted that they were all large, suggesting great black-backed, herring or possibly glaucous gulls. As these are not great seasonal indicators this lack of precision does not affect the interpretation of seasonality. The ptarmigan are the only truly terrestrial species of bird that were exploited by the Groswater Palaeoeskimo at Phillip's Garden West.

A number of terrestrial mammals were found in the Feature 18 collection. Three caribou specimens were identified. These elements were fragments of a cervical vertebra, a tibia, and a phalange. During my analysis I noted that a number of the unidentifiable

bone fragments had the texture of terrestrial rather than marine mammals. Some fragments were likely to have been caribou, implying that there may have been more caribou in the diet at this site than is apparent from the remains. The presence of the identifiable elements, as well as the apparent shattered terrestrial mammal long bones suggests that some portions of caribou could have been transported to this site, providing nourishment until the arrival of the harp seal herds in the early spring. The caribou could have been exploited during the winter when they moved over the barrens, or in spring during their migration toward calving grounds in the interior. In 2001 a small group of caribou over-wintered on the Point Riche Peninsula, with a few individuals remaining until early June (Renouf, pers. com. 2001).

The other terrestrial mammals found in the assemblage are red fox, wolf and beaver. These animals would be most valuable during the winter when their furs are at their best. However they would have been available year round in the general area. As mentioned in Chapter 2, there may have been less forest cover during the Groswater Palaeoeskimo occupation of the area. This would not affect the availability of wolf or fox to any great extent, as these animals are found in a range of habitats. The beaver would have been rare in the region because of its dependence on forests for food and shelter. The beaver is represented by six incisor fragments. It is possible that these teeth were useful as tools for hide working, or incising jobs (Tyzzer 1943). Consequently, it is possible that beaver were hunted elsewhere, and only their incisors transported to the site for uses other than subsistence. The wolf is represented by five molars, and the red fox

by a cervical vertebra, two molars and a femur fragment. With the exception of the femur, these portions of the animals would not be considered valuable in terms of providing meat, nor are they associated with hides. It is possible that the animals were killed nearby and the whole carcass returned to camp. Alternatively, the heads or teeth of these animals could have been retained for reasons other than subsistence. However, it is difficult to explain the femur and vertebra of the red fox. The wolf, red fox, and beaver do not provide conclusive seasonal evidence.

The only fish identified from feature 18 was the Atlantic cod. Based on the 29 identifiable specimens, a minimum of six individuals was represented. Most of the identifications were made on vertebrae, and based on their size, a MNI was generated. Evidence for fishing is almost non-existent for the Groswater Palaeoeskimo. Two possible net sinkers were identified at Phillips Garden East (Renouf pers. com. 2001), but no fish hooks or other evidence of fishing technology has ever been recovered from Groswater Palaeoeskimo sites. It is possible that this technology has not survived. In a now famous letter written in 1497, John Cabot described waters off the coast of Newfoundland as "swarming with fish, which can be taken not only with the net, but in baskets let down with a stone" (in Pope 1997:27). There is little ethnographic evidence for fishing nets being used by northern Eskimo hunters before European trade (Mathiassen 1927:58). Nevertheless, it is possible that the Groswater Palaeoeskimo had a technology such as baskets or, more likely, nets for capturing cod. These items would not have survived the archaeological record. If fish hooks had been used, it is presumed that they would have

been made from a strong material such as bone or ivory. Their absence from the archaeological record here at Phillip's Garden West and Phillip's Garden East where faunal preservation is excellent suggests they were not manufactured or not deposited at this site.

All of the cod vertebrae identified in this research are from large individuals, of over 60 cm in length (approximately 2.7 kg) . The presence of such large cod here can be explained in a number of ways. It is possible that these bones represent the contents of a seal's stomach. If this was the case one would expect to see pitting on the surface of the bones which results from exposure to the digestive tract (Lyman 1994:211). An examination of the cod bones in this assemblage showed no signs of this pitting. A second possibility is that the cod bones were the deposited remains of gull predation. This is unlikely since most of the cod vertebrae were from individuals of lengths greater than 75 cm (approximately 4.2 kg), too large to have been captured by gulls. Thus, it would appear that the cod were caught by Groswater Palaeoeskimo fishers. Cod are most commonly found in deeper waters; however, as mentioned in Chapter 2, cod will follow capelin and shrimp close to shore in the spring, rising to shallow depths until the summer heat drives them offshore into deep water. It seems most likely that cod was exploited in the spring and early summer from boats in shallow water.

Only one whale element was identified in this sample. The large size of these morphologically distinct elements normally makes them readily identifiable in a sample, and their relative scarcity suggests that whale exploitation was minimal, or indeed only

involved opportunistic scavenging.

Seal species dominate the faunal assemblage from Feature 18 at Phillip's Garden West. It is clear that seal hunting was the most intense subsistence activity carried out by the Groswater Palaeoeskimo here, and likely the reason for settlement at this location. A number of seal species are available in the area; however, it is the predictable migration of huge numbers of harp seal during the spring that probably provided the bulk of the seal meat at this site (see Chapter 2). Indeed, harp seals dominate among those *Phocidae* bones that could be identified to species. Grey, harbour, hooded, and bearded seals were also available, but mostly as isolated individuals which were probably exploited in an opportunistic way. It is likely that harp seals were the greatest exploitative focus at this site.

Table 4.3 shows the seasonal availability of the various seal species that were exploited. Most seal exploitation took place in the spring and summer. There is some possibility that the harp were present in the late fall (see Chapter 2). It is possible that 2000 years ago more harp were available on the eastern side of the Strait of Belle Isle during the fall southward migration than is apparent today. Fourteen fetal elements were identified in the seal samples from this feature. This suggests hunting of pregnant females in the winter as they made their way south. However, these numbers are very small, and it is possible that an early spring hunt of the Mecatina Patch could have resulted in the occasional exploitation of a female seal just prior to giving birth. Because it is difficult to distinguish fetal from newborn elements, it can not be ruled out that these bones represent

newborns taken from the Mecatina Patch in the early spring.

As stated in Chapter 2, it is most likely that the harp were taken during the early spring. They could have been hunted in a number of ways. Today Port au Choix hunters go out in boats from the land to hunt seals along the ice edge during the months of February and March (Renouf, pers. com. 2001). It seems likely that Groswater Palaeoeskimo hunters used boats to hunt seals along the edge of the pack ice using harpoons. Balikci (1970: xvi) notes that southwest Greenland Inuit hunt seals in this manner. It is also possible that large groups of seals hauled out on the beaches around the Port au Choix and Point Riche peninsulas. While harp seals rarely haul out on land, Port au Choix resident John Gould noted that numerous harp seals were seen on local beaches including Phillip's

Garden late this winter. Hunting seals from the land could have been accomplished by individuals or a number of hunters on foot. Earl Pilgrim, a resident of Roddickton on the east coast of the Great Northern Peninsula, reported numerous harp seals landing on beaches around the community in winter.

4.5.2 Feature 5A-5D

Feature 5A-5D, like Feature 18, is clearly dominated by phocid species, suggesting that subsistence activities centered on sea mammal hunting (Table 4.4). Again because of the ecology of this region, I would suggest that these phocids were likely to have been harp and that hunting was conducted during the early spring. Bird species are mostly

represented by the Alcids, including common and thick-billed murre, razorbills, and guillemots. For reasons mentioned above these species were likely to have been harvested during the spring and early summer (Table 4.5). Other birds in this sample include eider and gulls, the former available during the spring and fall, and the latter a year round occupant. Again the gull specimens were large, suggesting great black-backed, herring or glaucous gulls.

Terrestrial mammals are represented by a few specimens and include vole, beaver, caribou, black bear, and wolf. The vole NISP is large compared to the NISPs of the other terrestrial species, but they could represent only one individual that had died in the midden some time after its formation. The beaver is represented by one incisor, which could have been a curated tool. Both the wolf and black bear are represented by one molar each. As in the case of the beaver, this is hardly indicative of an intensive subsistence activity and probably represents either occasional opportunistic hunting of these animals or scavenging of teeth for reasons other than subsistence. The only caribou bone found in this sample was an astragalus. It is possible that some small amount of caribou was transported to this site from elsewhere. Whether it was transported to Phillip's Garden West or hunted from this site, caribou accounts for a very small part of the subsistence activity.

Fish species are represented by two cod specimens. As mentioned above, cod are available in relatively shallow water until the early summer, and were likely exploited during this time.

Finally, four whale specimens (MNI=1) were identified in this sample. As in

Feature 18, it is unlikely that whale exploitation involved anything more than opportunistic scavenging.

Table 4.4 Phillip's Garden West, Feature 5A-5D: Species Abundance by NISP and MNI

Scientific Name	Common Name	NISP	MN
FISH			
Gadidae	Cod	2	1
BIRD			
Eider sp.	Common and King Eider	2	1
Larus sp.	Gulls (Herring and Great Black-backed)	2	2
Uria sp. & Alca torda	Common and Thick-billed Murres and Razorbills	33	5
Cepphus grylle	Guillemot	2	1
MAMMAL			
Microtinae	Vole	17	1
Castor canadensis	Beaver	1	1
Cetacea	Whale	4	1
Ursus americanus	Black Bear	1	1
Canis lupus	Wolf	1	1
Phocidae	Seal & Walrus	636	11
Phoca groenlandicus	Harp Seal	3	1
Rangifer tarandus	Caribou	1	1
Total Specimens Identified Beyond Class		**707**	
Unidentifiable Fish		7	
Unidentifiable Bird		67	
Unidentifiable Mammal		2868	
Total Specimens		**3647**	

Table 4.5 Seasonal Availability of Feature 5A-5D Species.

	J	F	M	A	M	J	J	A	S	O	N	D
Atlantic cod			x	x	x	x						
Eider sp.				x	x					x	x	
Gulls	x	x	x	x	x	x	x	x	x	x	x	x
Uria sp. & Alca torda				x	x	x	x	x				
Guillemot				x	x	x	x	x				
vole	x	x	x	x	x	x	x	x	x	x	x	x
Beaver	x	x	x	x	x	x	x	x	x	x	x	x

	J	F	M	A	M	J	J	A	S	O	N	D
Whale				x	x	x	x	x				
Black Bear				x	x	x	x	x	x	x	x	
Canidae	x	x	x	x	x	x	x	x	x	x	x	x
Harp Seal	x*	x	x	x	x	x						x*
Caribou			x	x	x				x	x	x	x

* Possible but not likely to be available in the area.

4.5.3 Feature 5E

Bird and terrestrial and marine mammals make up the sample from Feature 5E. Despite the fact that there is a smaller variety of species present in the sample from Feature 5E than was apparent in Feature 18 (Table 4.6), the overall subsistence strategy remains the same over time. Again the bulk of the sample was seal species, suggesting the main exploitative activity during the later occupation of Phillip's Garden West continued to be seal hunting. Otherwise, there was only one murre element and two caribou bones. The caribou was represented by two humerus fragments. Again, some of the unidentifiable fragments appeared to be large terrestrial mammal, and could have been caribou. Nevertheless, caribou hunting from this site appears to have been relatively unimportant. This appears to be true for murre hunting as well, as this sample yielded only one element from this taxon.

Table 4.6 Phillip's Garden West, Feature 5E: Species Abundance with NISP and MNI

Scientific Name	Common Name	NISP	MNI
BIRDS			
Uria sp.	Common & Thick-billed Murre	1	1
MAMMALS			

Phocidae	Seal & Walrus	650	14
Phoca groenlandicus	Harp Seal	1	1
Phoca groenlandicus or Phoca hispida	Harp or Ringed Seal	1	1
Phoca groenlandicus or Phoca vitulina	Harp or Harbour Seal	2	1
Rangifer tarandus	Caribou	2	1
Total Specimens Identified Beyond Class		**657**	
Unidentifiable Fish		4	
Unidentifiable Bird		11	
Unidentifiable Mammal		2353	
Total Specimens		**3025**	

Table 4.7 shows the season of availability of species identified from Feature 5E. The seal and murre suggest a spring and early summer occupation, while the caribou could indicate both a spring and fall hunt. It is assumed that hunting methods did not change over the occupation of the site. It is most likely that the exploitation of both young and adult seals took place during their northward migration in the spring. Hunting probably involved harpooning at the ice edge, or on land.

Table 4.7 Seasonal Availability of Feature 5E Species

	J	F	M	A	M	J	J	A	S	O	N	D
Murre sp.				x	x	x	x	x				
Harp Seal	x*	x	x	x	x	x						x*
Caribou			x	x	x				x	x	x	x

* Possible but not likely to be available in the area.

4.6 Intra-site Variability in Species Abundance and Seasonality

By examining faunal samples that are chronologically separated, it is possible to compare the subsistence activities that took place at this site over time, including the degree of species diversity and the season of occupation. My results demonstrate that

there is not a great deal of variation in the nature of subsistence over time at Phillip's Garden West. From the above presentation it might appear that the Groswater Palaeoeskimo hunters at Phillip's Garden West first inhabited this site as generalists who exploited a variety of species, over time becoming more focused on seal hunting and less so upon other species. However, the size of the samples from Feature 5A-5D and Feature 5E are much smaller than Feature 18. It is the nature of the sample size that accounts for the differences in species diversity witnessed.

In discussing the variety of taxa exploited at archaeological sites Grayson (1984) distinguishes two concepts, general diversity and richness. Richness refers to the number of a taxa present in an assemblage, while general diversity refers to the number of taxa present as well as the relative frequency of each (Cruz-Uribe 1988). Grayson argues that sample size is tightly correlated with faunal assemblage richness and diversity. Basically, as the sample size increases, the number of taxa will increase. Obviously at some point no more taxa will be recognized regardless of sample size. Grayson (1984:154-158) statistically illustrates this observation with numerous examples. From his work it appears that samples of less than 1000 identifiable specimens will not generate an accurate picture of species richness and diversity. This is the case with two of the samples from Phillip's Garden West.

Feature 5A-5D has 707 identifiable specimens (Table 4.4) and Feature 5E has 657 (Table 4.6). While this suggests that sample size is responsible for the observed lack of species richness in these two samples compared to Feature 18, a number of observations

can be made about subsistence behaviour at this site. It is clear that seal hunting was the primary economic focus of the inhabitants at this site. This species was available in huge numbers in a predictable location at a predictable, yet short, period of time each year. From an analysis of the taxa represented and their relative abundance, it is clear that the Groswater Palaeoeskimo settled at Phillip's Garden West repeatedly in order to exploit the harp seal populations that would arrive each spring. During that time, other species that were also relatively predictable in time and space were exploited. These included other seal species, the large murre and razorbill colonies and the cod fish that congregated in the shallow inshore waters for a short time during the early summer. Other animals such as wolf, bear, beaver, fox and various salt and freshwater birds occasionally entered the diet. Caribou may have been of greater importance at other times of the year and in other locations. Although many of the fragments of unidentifiable mammal from Phillip's Garden West could have been caribou, these fragments are not so numerous as to suggest an intentional hunt to return large quantities of caribou to this site.

One of the criticisms of MNI is that rarely occurring species can be over-represented compared to more commonly exploited species. This could certainly be the case with the faunal assemblages from Phillip's Garden West. For example, many of the bird and terrestrial mammal species are represented by one or two specimens, generating an MNI of at least one. The phocid elements are represented by hundreds or thousands of bones, while the MNI designation remains quite low. In Feature 18 for example, phocids are represented by 3980 specimens generating an MNI of 24, while the next most

numerous NISP is for murre and razorbill at 37, giving an MNI of 5 (Table 4.2). Despite the fact that the importance and concentration on seal exploitation can be blurred somewhat by MNI designations, it was the animal that was of greatest importance to the economy of the Groswater Palaeoeskimo at this site, regardless of the time period.

Stating during what seasons a site was abandoned is difficult. As Davis (1987:75) explains, "absence of proof is not proof of absence." A glance at the seasons represented by the species recovered in this analysis of Phillip's Garden West (See Tables 4.3, 4.5, 4.7) would suggest that the site was occupied year round. A more careful consideration of the taxa represented and their relative abundance suggests that it is unlikely that the site was occupied during the fall. Most of the species available in the fall and winter are also available in the spring or summer. Only the dovekie is rare in the spring and summer. However, this bird is represented by one MNI in Feature 18 (Table 4.2). The large amount of seal bone at the site, the fact that the spring is the time of a huge, predictable seal migration in this region, and the absence of any remotely abundant species available in the fall and early winter strongly suggests a site that is specialized around one resource during the season of that resource's availability.

In summary, Phillip's Garden West was a site that Groswater Palaeoeskimo people repeatedly visited to exploit the huge seal populations that became available during the spring each year. They supplemented their diet with a few other species, including caribou, and particularly cod and murre which were also available for a few months each spring and into the early summer.

4.7 Species Abundance, Hunting and Seasonality at Phillip's Garden East

Table 4.8 shows the species abundance exhibited in the Phillip's Garden East sample used in this research. Seal exploitation is the main focus of subsistence activities at this site. A number of seal species were exploited, including harp, hooded, and harbour. Bird species included eider ducks and gulls, and the only terrestrial mammal found was the beaver. The beaver was represented by incisor fragments, and as mentioned above these may be tool fragments and not evidence of subsistence. Both gull and eider species were available in great numbers, and predictable in terms of timing and location. Likewise, the hunting of harp seal would have made the inhabitants of this site fairly focused on species that were predictable both temporally and spacially. Nevertheless, the presence of the less predictable harbour and hooded seals demonstrates some degree of generalist or opportunistic subsistence behaviour.

Table 4.8 Phillip's Garden East: Species Abundance by NISP and MNI

Scientific Name	Common Name	NISP	MNI
BIRDS			
Somateria or Melanitta	Eider or Scoter	1	1
Larus sp.	Gulls	10	2
MAMMALS			
Castor canadensis	Beaver	3	1
Phocidae	Seal & Walrus	1000	9
Phoca groenlandicus	Harp Seal	15	3
Phoca vitulina	Harbour Seal	1	1
Cystophora cristata	Hooded Seal	2	1
Phoca groenlandicus or Phoca hispida	Harp or Ringed Seal	2	2
Total Specimens Identified Beyond Class		**1034**	
Unidentifiable Fish		4	
Unidentifiable Bird		26	
Unidentifiable Mammal		3191	

Total Specimens	4155

Table 4.9 illustrates the seasons of occupation represented by the faunal sample from Phillip's Garden East. Although there are few seasonal markers in this sample, occupation appears to be concentrated during the spring, but other seasons can not be ruled out. Seventeen bone fragments identified from this sample were from fetal or newborn seals. This suggests a possible winter hunt along the coast for the occasional harp traveling south on the east side of the Strait of Belle Isle, or an early spring hunt at the Mecatina Patch. If these bones are from newborn seals, it implies that hunting may have involved travel on ice to capture newborn harps in addition to open boat and land-based hunting. However, this is a very small number of specimens and can not demonstrate a consistent subsistence strategy.

Table 4.9 Seasonal Availability of Phillip's Garden East Species

	J	F	M	A	M	J	J	A	S	O	N	D
Eider or Scoter			x	x	x	x	x	x		x	x	
Gulls	x	x	x	x	x	x	x	x	x	x	x	x
Beaver	x	x	x	x	x	x	x	x	x	x	x	x
Harp Seal	x*	x	x	x	x	x						x*
Harbour Seal			x	x	x	x	x	x	x	x	x	
Hooded Seal		x	x	x	x							

* Possible but not likely to be available in the area.

4.8 Inter-site Variability: Comparison Between Phillip's Garden East and Phillip's Garden West

Before a comparison can be made between the samples from Phillip's Garden West and those from Phillip's Garden East it is necessary to discuss one aspect of the samples in

this research. The Phillip's Garden West samples are from clearly defined midden features. The samples that have been used for Phillip's Garden East are from features often described as storage pits. Any differences could be seen as reflecting the nature of the deposits, and not the result of different exploitative behaviour. I have certain reservations about designating the Phillip's Garden East features as storage pits. There are characteristics of these features that lead me to interpret them as midden deposits, and thus comparable to the Phillip's Garden West features.

During excavations, feature designations were given to concentrations of bone, sometimes describing them as storage pits in slight depressions with stone caps. These features were most often less than 10 cm deep and the faunal material within them did not suggest the storage of meat packages. This suggests they should be interpreted as shallow middens rather than storage pits. The variety of species found and the particular elements indicates a mixture of disarticulated pieces from a number of animals, suggesting a midden deposit. Articulated limbs or other meat packages, which might suggest storage, were only very occasionally seen in these features. A look at the bones found in these features suggests disarticulated pieces of relatively low meat value (see Chapter 5). They may have been directly deposited after initial butchery. The associated material found in these features often included fire-cracked rock, charcoal and artifacts. This was the case in Features 29, 37, 53, and 55. The presence of this mixed faunal material as well as refuse associated with it further suggests a midden rather than a storage feature. It is possible that these features, especially those that were stone-lined such as Feature 29, were initially

used for storage, but eventually became refuse dumps at the end of their use life. Perhaps flat stones were thrown over them to allow the occupants of the site easy footing around the site. Together the evidence allows me to suggest that the contents of the features at Phillip's Garden East are midden deposits, permitting a comparison of the faunal assemblages at this site with those from Phillip's Garden West.

The seasonal information from both sites indicates occupation at the same time of year. Both Phillip's Garden West and Phillip's Garden East represent spring and summer occupations that concentrate on seal exploitation, supplemented by other species available during the same period of the year. The presence of seal fetal bone in Feature 18 at Phillip's Garden West and also at Phillip's Garden East suggests some evidence of winter hunting of pregnant females, or could also indicate hunting of newborns from the Mecatina Patch in the very early spring.

Faunal identification by Darlene Balkwill of the Canadian Museum of Nature from midden features elsewhere on the site at Phillip's Garden East suggests a more generalist subsistence tradition during the earlier Groswater Palaeoeskimo period in the Port au Choix region (see Appendix A). Her analysis identified terrestrial mammal species including red fox, beaver, marten and caribou. Fish were represented by cod, herring and plaice, while bird species included a variety of saltwater and freshwater ducks, geese, gulls and ptarmigan (Kennett 1991). This broad range of species is very similar to the earlier period at Phillip's Garden West. As in Feature 18 at Phillip's Garden West, these non-phocid specimens are represented by very low NISP numbers and MNI.

4.9 Chapter Summary

The examination of faunal remains from two Groswater Palaeoeskimo sites in the Port au Choix region shows that the subsistence practices at both sites are very similar and do not appear to change over time. The preceding chapter introduced the samples of faunal remains examined, detailing the taxa exploited and the relative abundance of each. This allowed a discussion of the seasons during which the sites were occupied, and allowed an intra-site evaluation of subsistence at Phillip's Garden West, and an inter-site comparison between Phillip's Garden West and Phillip's Garden East. The results showed that the Groswater Palaeoeskimo came to the region to exploit the migrating seal populations which arrived each year in the spring. Other species contributed to the diet, making up a small part of the subsistence activities at these sites. The next chapter will extend the analysis to allow a comparative discussion of how the seal species at these sites were processed.

CHAPTER 5
PHOCIDAE BODY PART FREQUENCY

> Because of their shared qualities of personhood, humans and animals treated each other with mutual respect. People did not consider animals a nonsentient resource to be harvested according to the dictates of human need, but rather classes of persons with whom they had established relationships, complete with mutual obligations. When animals entered human space, men and women treated them as honored guests to be hosted and sent away satisfied (Fienup-Riordan 1994).

5.1 Introduction

One of the most important characteristics of a faunal assemblage is the frequency of each skeltal element for each taxon in a sample. Patterns of differential frequencies of elements or sections of skeletons has long been of primary interest to zooarchaeologists (White 1953, 1956; Brain 1981; Perkins and Daly 1968). Initially it was assumed that cultural behaviour dictated the configuration of elements in an assemblage (White 1953,1956). Now it is known that a great number of natural and cultural agents can account for the differential accumulation of bone on an archaeological site. Distinguishing what factors, or combination of factors, result in the body part frequency of a faunal assemblage can be extremely daunting. Bones can be removed from a site or destroyed by scavenging carnivores (Behrensmeyer 1983, Binford 1978) or by the chemical and physical agents of weathering (Lyman 1994). Variation in the frequency witnessed is affected by the density of the elements (Lyman 1984, 1994). Furthermore, human hunting, scavenging, transporting, butchering, cooking, consuming, and disposing of

elements can all influence the configuration of specific elements present on a site (Binford 1978; Lyman 1994; Reitz and Wing 1999).

This chapter introduces the history of analyzing body part frequency. The faunal samples examined in this thesis all indicate that seal hunting, probably harp seal was of primary importance to the settlement and subsistence of the Groswater Palaeoeskimo inhabitants. The frequency of body parts from the identified phocids is described and interpreted. The basic assumption in this research is that the configuration of body part frequencies contributes to an understanding of how *Phocidae* were hunted and processed at Phillip's Garden West and Phillip's Garden East. The methods used in analyzing the faunal assemblages are stated explicitly.

This inquiry begins with a discussion of the way faunal analysts have explained the frequency of animal body parts on sites. Approaches to this have focused on both human and non-human agents. These studies have expanded our understanding of the taphonomic processes that influence the survival of bones. Despite their potential for explaining variation in faunal body part frequency, there are some problems with these interpretive methods. Of particular interest to the present study is the meat utility of the parts of seal, as well as the relative bone mineral density of these parts. Ethnoarchaeological research directed toward the decisions hunter-gatherers make in the transport of body parts has broadened over the last three decades to show there is a great deal of variation in this process.

Following this discussion of the method and theory involved in understanding body

part frequency, I turn to the faunal assemblages from Phillip's Garden West and Phillip's Garden East used in this thesis. I describe the frequency of phocid body parts for these samples and interpret the observed frequency by addressing both natural and cultural factors to account for my observations. I describe the relative meat value of the elements in my samples in order to discuss the possibility that seal parts were differentially deposited as a result of decisions about the transport of particular meat portions. I then turn to the relative bone mineral density of the elements that were deposited at the sites and discuss the possibility that density-mediated destruction influenced the survival of elements on these sites. Other non-faunal, archaeological evidence from the sites contributes to a holistic interpretation of the settlement and subsistence strategies of the Groswater at Phillip's Garden West and Phillip's Garden East.

5.2 Body Part Frequency in Zooarchaeology

Theodore White was among the first to undertake the analysis of body part frequency in archaeological faunal assemblages. His work in the early to mid 1950s (White 1952, 1953, 1956) greatly contributed to the approaches since taken to interpret body part frequency. For instance he recognized the role of human decision-making processes and butchering practices to explain variability, and sometimes drew on ethnographic examples to suggest butchering strategies (White 1956:401). White explained variability in skeletal part frequency by making a number of interpretive assumptions. He assumed that not all parts of an animal will be returned to the residential

site from the kill location. Secondly, he assumed that skeletal parts that carry very little meat will be the portions to be discarded at the kill site, while those with the greatest amount of meat will be returned to camp (White 1952). The absence of elements of high meat value on campsites was recognized by White and explained as either due to accidents of preservation or sampling, or to butchering practices that rendered the elements unidentifiable (White 1952:337).

Perkins and Daly (1968) proposed a concept called the *schlepp effect* to explain variation in the skeletal part frequency of a neolithic faunal assemblage from Turkey. They observed that there was a relatively large number of cattle distal limb bones compared to a low number of proximal long bones at the site. In an effort to explain why bones of low meat value were highly represented on what they interpreted as a residential site, they stated that the size of the prey and the distance between the kill and residential sites could determine whether bones will get discarded at the kill site. They suggested that animals killed at a great distance would be stripped of meat, and that meat would be laid in the hide, and using the feet as handles, dragged back to the residential camp.

Over ten years later Binford (1981) attacked this interpretation with characteristic ferocity. He pointed out that although Schiffer (1976:21) referred to the *schlepp effect* as a law, he described it as "a post hoc accommodative argument that seems to have very little to recommend it" (Binford 1981:184). He went on to note that it was not based on any ethnographic information, "it is sheer accommodative fantasy, yet it has served as the interpretative basis for a number of arguments about fauna" (Binford 1981:184).

Binford's aim was to show that much of the interpretation of faunal assemblages is based on myth, or stories, rather than the formulation of testable hypotheses. Beginning in the 1960s the importance of understanding processes in the formation of the archaeological record led to a more systematic examination of faunal assemblages. Binford and Binford (1966:241) state:

> if we assume that variation in the structure and content of an archaeological assemblage is directly related to the form, nature, and spatial arrangement of human activities, several steps follow logically. We are forced to seek explanations for the composition of assemblages in terms of variations in human activities. The factors determining the range and form of human activities conducted by any group at a single location (the site) may vary in terms of a large number of possible causes in various combinations. The broader among these may be seasonally regulated phenomena, environmental conditions, ethnic composition of the group, size and structure of the group regardless of ethnic affiliation. Other determining variables might be the particular situation of the group with respect to food, shelter, supply of tools on hand, etc.

Although originally referring to stone tool assemblage variability, Binford shifted his focus, but not assumptions, to the observation of faunal assemblages in his ethnoarchaeological research among the Alaskan Nunamiut Eskimo (Binford 1978). He believed ethnoarchaeological research focusing on the treatment of animals offers an excellent opportunity to understand the cultural mechanisms that dictate the formation of faunal assemblages. Because modern hunters would have to make many of the same decisions about strategies for hunting and processing animals, and that animal morphology and ecology remains the same over time, Binford felt this line of ethnographic inquiry is particularly helpful in offering insights into interpreting past faunal assemblages and the cultural rules that govern their formation.

To test White's original assumption that proportions of various body parts will be found at particular kinds of sites depending on their meat values, Binford developed an index of the food utility of specific carcass parts, referred to as a general utility index (GUI). He measured the amounts of meat, including the weight of fat and muscle tissue, marrow and grease on each element of two domestic sheep and a caribou. He calculated marrow weight by multiplying marrow cavity volume by the percentage of fatty acids in the marrow, and grease weight by multiplying the volume of cancellous portions of the skeleton by the percentage of fatty acids present in the marrow (Binford 1978:19-37). Binford argued that together the relative amounts of these food components would influence decisions about how an animal would be butchered, transported and stored. Because Binford noted that animals are not always butchered into the units for which he had generated meat values, he developed a modified general utility index (MGUI) to account for parts with low GUI values that often remain attached to portions with high GUI values. These parts are referred to as "riders" by Binford (1978:74). For instance, although the metatarsal is relatively low in utility value, its proximity to the femur of relatively high value means that it is often transported despite its low utility. He gave the part with the low GUI a value equal to the average of that part and the attached, high GUI part. All utility values were then normed from 1 to 100 by dividing all derived values by the greatest derived value in a column and multiplying by 100. Normed MGUI values are expressed as %MGUI. This allows for easy comparison among samples. Others have used these indices and developed their own (Metcalfe and Jones 1988; Lyman et al. 1992;

Kooyman 1984). Lyman et al. (1992) developed a meat utility index (MUI) for phocids that does not measure grease or fat.

Binford's (1978) ethnoarchaeological work included recording how animals were butchered at various sites throughout the year. In addition, he conducted numerous interviews about preference of meat, marrow and grease associated with various skeletal parts. The interviews confirmed that preferences were based on high values of these food products. These results closely mirrored the indices he developed (Binford 1978:40).

Binford used his indices to examine skeletal elements remaining at sites. He suggested that at kill sites elements of low GUI would be most frequent, while more valuable portions would be returned to the residential site. Here elements of high GUI value would be more frequently represented than those that carry little meat, grease or marrow. He plotted the relationship between utility value and the frequency of particular elements on a site and generated a number of characteristic curves (Binford 1978:81). He noted a number of instances of variation from this generalization, but essentially his ethnoarchaeological work supported his assumption that carcass portions will be differentially treated depending on their energy return.

Binford's work inspired a fair amount of subsequent ethnoarchaeological research focused on the treatment of animals (Bunn et al. 1988; O'Connell et al. 1988; O'Connell and Marshal 1989). While some of this work generated results similar to Binford's (O'Connell and Marshal 1989), some investigations contradicted his predictions (Bunn et al. 1988; O'Connell et al. 1988). These new investigations are insightful in that they

demonstrate variation in behaviour and strategies, and how this behaviour generates a different kind of faunal assemblage.

O'Connell et al. (1988) conducted ethnoarchaeological research among the Hadza of central Tanzania, examining hunting, butchering and bone transport activities. They contended that this research was partly directed to test current models of hunter-gatherer bone transport which state that decisions about body part transport that will maximize net nutritional benefit (most meat for the least effort). Their primary research question asked what factors shape contemporary hunter-gatherer behaviour with respect to carcass treatment and the formation of archaeological faunal assemblages. They described and analyzed the acquisition, butchering, transport, consumption and disposal of large mammal carcasses, and the archaeological implications of this behaviour.

In their fieldwork observing carcass disarticulation, transport and consumption, O'Connell et al. (1988) witnessed more variability then expected. They found that for medium to large species, bone transport and discard patterns reflected nutritional efficiency; however, some of their observations did not support this. When the effort to strip some bones was time consuming, they were returned to camp for later processing. They found that vertebrae, scapulae, pelvises, and upper limb bones, were more likely to be transported to camp. Body portions of relatively high value were sometimes consumed at the butchery site, which O'Connell et al. suggested may be done to reduce transport costs and competition for choice pieces at the base camp. They noted that sometimes the Hadza stripped meat from all bones at the butchery site.

The portions of body parts returned to base camp were seen to vary greatly depending upon the condition of the carcass. Besides hunting, the Hadza often scavenged meat from kills made by other predators. Sometimes they encountered these animals after the predator abandoned the kill, in which case very little of the carcass remained. Frequently, the Hadza drove predators from kills. Under these circumstances, a great deal of meat may be retrieved. The most commonly retrieved pieces from moderately damaged carcasses were axial elements such as vertebrae. Limb elements, especially forelimbs, were most commonly taken from heavily damaged carcasses, followed by skulls, mandibles and upper vertebrae. In summary, O'Connell et al. (1988) characterized the Hadza treatment of bones, including disposal, as variable and context dependent. The recovery of body parts in an archaeological context may depend on factors such as whether the animal was hunted or scavenged.

Like O'Connell et al. (1988), Bunn et al. (1988) examined issues of bone assemblage formation among the Hadza. Their primary aim was to examine the question of how well the principle of transporting appendicular portions of large mammal carcasses to base camps, while abandoning axial portions at the kill site, was supported by data collected among the Hadza. The results of their research did not demonstrate agreement with this principle. Many of their results mirrored those observed by O'Connell et al. (1988), but they offered greater insight into the treatment of animals by dividing them into a number of size categories for analysis. They demonstrated that there was variability in the treatment of carcasses that did not optimize nutritional efficiency. O'Connell et al.

(1988) suggested that reducing weight of transport, and stripping meat from limb bones at the kill site might be the reasons why limbs bones are not returned to base camp. Bunn et al. (1988) demonstrated that the hunter's desire to consume the choicest pieces was also a determining factor, and indeed, the most relevant consideration of what portions were returned to the camp site. When killing larger animals, one option for retrieving the largest possible yield was to enlist the assistance of base camp members. The authors noted that this was often decided against, and choice pieces were consumed to deliberately avoid sharing the best parts (Bunn et al. 1988:442).

Large carcasses presented greater transport problems to Hadza hunters. In some cases the authors noted that appendicular, rather than axial sections of large carcasses were returned to camp, but they suggested that this evidence was circumstantial and did not reflect all situations. They suggested that the time of day that the animal was hunted influenced how much meat makes it back to camp. If the animal was dispatched early enough in the day, then most of the carcass was returned to camp with the assistance of all members of the base camp community.

The largest animals in this study comprised only giraffe. Bunn et al. (1988) observed that during some of the processing of giraffe kills, only meat was returned to camp, while at other times large portions of the carcass were retrieved. Distance between the kill and camp site tended to determine this situation, as well as the number of members enlisted to do the carrying.

Like O'Connell et al. (1988), Bunn et al. (1988) observed that carcasses retrieved

from scavenged animals showed the greatest amount of variability, depending on their condition. A wide range of variability in transport of carcass parts and the resulting accumulation of bone assemblages was recorded by this study; leading them to conclude conclude that their research revealed

> "A rather daunting amount of variability in the processing of carcasses and in the patterns of the resulting bone residues. There is no single Hadza way to butcher and transport a carcass; rather depending on various factors, most of which are archaeologically invisible, the Hadza may transport essentially all carcass and skeletal units to base camps, or they may transport prodigious quantities of meat with few attached skeletal units."(Bunn et al. 1988:451)

Different results were reported by O'Connell and Marshall (1989) during their study of kangaroo body part transport among the Alyawara of central Australia. Here much less variability was observed in the butchering and transport of this animal. The authors showed that hunters usually transported most body parts from kill sites, and those portions discarded had only small amounts of edible tissue attached. This behaviour was consistent with the aim of making the greatest amounts of edible tissue available to the residents of the base camp. Indeed, the highest ranking meat on the legs was never consumed in the field (O'Connell and Marshall 1989:402). The kangaroo were consistently butchered into ten pieces for transport, sometimes butchered and cooked in the field before being returned to camp. The Alyawara treatment of animals is very similar to Binford's discussion of the Nunamuit. Both groups intentionally ensure that the most highly ranked cuts of meat are returned for general camp consumption. From their research among the Hadza, both O'Connell et al. (1988) and Bunn et al. (1988)

recognized that there is much greater variability than is seen among other hunting and gathering groups. However no explanation for this variation is offered.

These authors fail to place the activity of animal exploitation into a cultural and ecological context. Cultural traditions and social organization will influence decisions about what portions will be returned to camp for distribution. In societies where sharing behaviour is strictly adhered to, the return of meat is less likely to be variable. In addition, the ecology of the species exploited, their relative predictability over space and time, the ease of capture and the quantities available will all influence how portions of the animal will be treated. The ethnoarchaeological studies reviewed above did not address the implications of these aspects of animal exploitation. They confined their discussion to the description of the behaviour of exploitation without addressing the factors that could explain the decisions influencing the behaviour they witnessed.

One final point to be made about the ethnoarchaeological studies reviewed here is a criticism leveled at ethnoarchaeology in general. The duration of ethnoarchaeological work can range from a few days to a year or more. In terms of understanding the variability we witness in the archaeological record, it is difficult to assess what information gathered by the ethnoarchaeologist will be applicable to the archaeologist interpreting the remains of a site that might have spanned hundreds of years. Schiffer (1978) cautions that time depth must be considered as the short term perspective offered by ethnography and can distort the view one obtains of the dynamics of an ongoing system. Bunn et al. (1988) provided the account of a hunter who consumed the best parts of a carcass just prior to

entering the base camp. This was used to demonstrate that returning the highest quality meat cuts was not a concern of the hunter. Such behaviour would have to be repeatedly observed to be of use to archaeologists trying to interpret faunal assemblage variability. Ethnoarchaeology needs to ensure that trends are being recorded, rather than incidents, as the latter will not be relevant to the archaeologist. Indeed, it would be interesting to explore the patterns of body part frequency that emerge over the long term in faunal assemblages such as those described by O'Connell et al. (1988) and Bunn et al. (1988). Only after long term observation could the development of models take place. Patterns or a lack of patterning may result from cultural practices such as the formality of sharing and the common practice of scavenging.

At the same time that research focused on cultural factors affecting faunal assemblages, other studies were directed toward the differential survival of elements due to chemical and physical agents, and the nature of bone itself (Brain 1981; Lyman 1984, 1991a, 1992). Environmental conditions such as wind, rain, freezing, thawing, and drying can physically change bone, and cause it to lose its integrity (Reitz and Wing 1999:116). In addition, the conditions of the burial environment, particularly the pH of the soil can be destructive to bone. Both alkaline and acid soils have a tendency to hasten destruction of bone the further they are from neutral (Gordon and Buikstra 1981; Reitz and Wing 1999). Bone survives these destructive forces differentially. The hardest, densest bones, teeth and shell are more likely to withstand destruction. A desire to understand these forces and their effects has led to important research.

Of particular interest is the structural density of bones, as it appears that hard bone will survive destruction by humans, carnivores and weathering better than soft bone. Lyman (1984) demonstrates that density is a crucially important variable in the survival of bone over time, and is important in explaining variability in fossil survivorship. Nevertheless he points out that researchers have not always been explicit in defining how they derive bone density, making it difficult to determine whether similarities or differences are the result of taxonomic differences, or the measurement technique used (Lyman 1984). Lyman (1994:237) prefers to use the term structural density because it denotes the ratio of the mass of a substance to its volume, and cannot be confused with the density of a substance within a geographical area such as an excavation unit. Bone is not usually heterogenous, and structural density measures an average characteristic of the sample. For instance, the composition of a skeletal element has a ratio of spongy to compact bone. This ratio will be different depending on the element, and the location on the element. Researchers calculate density in different ways depending on how they derive the volume of porosity, thus making their measurement results differentially controlled (Lyman 1984:263).

A technique called photon absorptiometry was developed to derive the mineral densities for a number of locations on skeletal elements (Lyman 1984; Kreutzer 1992). A photon beam of known strength is passed through a number of points on an element and the strength of the beam is measured. The higher the mineral content of the scan sites on the element, the weaker the beam, or the fewer the photons that will pass through that site

(Lyman 1994:238). Sites on elements are chosen for scanning that will reflect known structural variation within each bone, that are easy to locate and describe on the basis of anatomical features, and that include portions that are often found on archaeological sites. The resulting structural density values are intended to be used as a frame of reference for comparison to archaeological assemblages of the same taxa. Lyman (1994:252) warns that these values are at best an ordinal scale. He points out that structural density values are averages of a number of individuals, and that variation can exist in structural density with age, sex, nutritional status and genetics. Lyman (1992:12) summarizes the various studies of bone density as showing, (a) density is greatest in bone portions that have the greatest compressive and tensile strengths, (b) density is greatest in bones subjected to the greatest weight bearing stresses, and (c) increasing porosity (decreasing bulk density) of bone reduces bone strength.

Structural density values are compared to frequency values of skeletal elements from archaeological faunal assemblages to determine if a correlation exists between the relative structural density and the survivorship of the bones. Positive correlations have resulted in a number of cases described by Lyman (1994:257). However, a true correlation does not necessarily mean that the character of the archaeological sample is the sole result of differential survival due to structural density differences among elements. If other techniques such as utility indices indicate a correlation with meat value and element frequency on a site, the researcher is left to wonder whether to explain body part frequency as a product of differential survival of elements, or differential transport and

utility of the elements. This problem of interpretation will be discussed in detail below.

Lyman (1992) suggests that body size and shape will influence the food utility of different carcass parts, as well as the volume density of the bones associated with those parts due to the differential stress these parts will be subjected to throughout the life of the animal. Obviously trying to assess the explanation for the frequency of body parts in an archaeological sample is difficult as numerous factors, either alone or in combination, can influence the formation processes.

Lyman (1992:19) states, "clearly other kinds of archaeological evidence should be used to establish the monitoring perspective. Are all tools associated with the bones hunting tools? Are there associated habitation structures? Are there cooking-related features present?" These are worthwhile areas of inquiry. In addition, it is important to describe the context of this type of faunal analysis, both cultural and natural. The ecology of the prey species, proximity to the kill location, hunting technology, and the possibility of damage caused by carnivores must be assessed for each study.

5.3 Body Part Frequency: Interpretive Methods for Phillip's Garden West and Phillip's Garden East

The analysis of body part frequency at Phillip's Garden West and Phillip's Garden East will be confined to the phocid bones which are overwhelmingly the most frequent taxon represented. Body part frequency is firstly calculated by determining the minimum number of elements (MNE) that can be accounted for by the fragments and whole

elements in each sample. As described in Chapter 4, particular landmarks on elements were given zone numbers. To avoid over-representing fragmentary elements, the most frequent zone is counted to give the MNE for that element. Zones for phocid seals are assigned following Hodgetts (1999). Zonal designation is given only when half or more of the zone is present, and MNE is generated regardless of side or state of fusion. The frequency of different elements within one individual animal varies. For instance there are five cervical vertebrae and only two humeri in seals, potentially resulting in the impression that cervical vertebrae are more frequently deposited than humeri. In order to avoid the problem of apparent over-representation, each element is further divided by the number of times it occurs in the individual. This calculation is referred to as the minimum animal units (MAU) (Binford 1984:50; Grayson 1984). MAU values allow a direct comparison among the frequencies of different elements. In order to compare the relative frequencies of body parts in samples of different sizes, %MAU is used in this analysis. This is a method of standardization that is calculated by expressing the highest value (MAU) as the standard, and dividing all other MAU values by this standard (100%) and multiplying by 100 (Binford 1978:72, 1981; Bunn and Kroll 1988).

To relate the faunal assemblage configuration of each sample to relative food utility, I use the meat utility index (MUI) for phocid seals developed by Lyman et al. (1992) and plot this against the MAU of each sample. In their research Lyman et al. based their utility index on the average weight of meat per skeletal portion from three harp and one hooded seal. The results indicate the rib cage is of greatest food utility, followed in

order by the pelvis, vertebrae, proximal limb elements, and finally, distal limb elements rank lowest in food value. They follow Binford (1987:453) in maintaining that these utility indices should be viewed as a frame of reference for interpreting body part frequency. They warn that other factors must be considered, including the structural density of skeletal parts and the cost benefits of transport (Lyman et al. 1992:540).

The harp seals in the Lyman et al. (1992) study were an adult male weighing 150 kg., an adult female weighing 132 kg, including a foetus which weighed 9.09 kg, and a juvenile male weighing 52 kg. The hooded seal was a juvenile male weighing 52 kg (Lyman et al. 1992:533). After the total weight was recorded each seal was butchered and the portions weighed before and after the removal of meat. They then averaged the meat weight for the three harp seals plus the hooded seal. Table 5.1 shows the weights of the harp seals averaged, as well as the average flesh weight of the harps and the hooded seal. Percent MUI was calculated from these weights by taking the heaviest meat portion, making it 100%, and then dividing the other weights by it and multiplying by 100.

While lacking the clear ethnographic references of Binford (1978), Lyman et al. (1992) draw on the limited ethnoarchaeological work of one of the authors to evaluate the analytical value of their phocid meat utility index for archaeological application. During the late winter and early spring of one year Whitridge observed the hunting of twenty ringed seals by Inuit hunters in the Clyde River district of the eastern Canadian Arctic. While most of the seals were returned to the residential site whole (10-20 km), nine of the twenty seals were at least partially butchered. He noted that a variable number of

vertebral segments and four other large meat units were transported. These included, "1, one side of the rib cage with attached fore limb, 2, the other side of the rib cage with attached fore limb and sternum, 3, the head and neck, and 4, the pelvic girdle and rear limbs (not separated into left and right halves" (Lyman et al. 1992:539). To account for these riders Lyman et al. (1992) followed Binford's method of giving the low meat value part an average of it and the associated high meat value part. This resulted in a modified meat utility index (MMUI) for the phocids. Table 5.2 shows the derivation of the %MMUI from flesh weights generated by Lyman et al. (1992:540).

Table 5.1 Average Flesh Weights (rounded to the nearest g) and %MUI per Skeletal Part for Three Harp Seals and One Hooded (taken from Lyman et al. 1992:537)

Skeletal Part	Three Harp Seals Average Flesh Weight	%MUI	One Hooded and Three Harp Seals Average Flesh	%MUI
Head	1324	20.7	1520	27.4
Cervical	2205	34.5	1989	35.8
Thoracic	1389	21.7	1380	24.9
Lumbar	1858	29.1	1827	32.9
Pelvis	2723	42.6	2473	44.5
Rib	6393	100	5553	100
Sternum	169	2.6	151	2.7
Scapula	1295	20.3	1098	19.8
Humerus	690	10.8	595	10.7
Radius/Ulna	284	4.4	265	4.8
Femur	309	4.8	249	4.5
Tibia/fibula	1062	16.6	918	16.5
Front Flipper	144	2.3	130	2.3
Rear Flipper	493	7.7	429	7.7

Table 5.2 Derivation of the %MMUI from Flesh Weights (taken from Lyman et al. 1992:540)

Anatomical Portion	One Hooded and Three Harp Seals Average Flesh Weight	Parts Averaged	Modified Flesh Weight	%MMUI
Head	1520	Head & Cervical	1754.5	31.6
Cervical	1989	None	1989	35.8
Thoracic	1380	Thoracic & Rib	3466.5	62.4
Lumbar	1827	Lumbar & Pelvis	2150	38.7
Pelvis	2473	None	2473	44.5
Rib	5553	None	5553	100
Sternum	151	Rib & Sternum	2852	51.4
Scapula	1098	Rib & Scapula	3325.5	59.9
Humerus	595	Scapula & Humerus	846.5	15.2
Radius/Ulna	265	Humerus & Radius/Ulna	430	7.7
Front Flipper	130	Radius/Ulna & Front	197.5	3.6
Femur	249	Pelvis & Tibia	1695.5	30.5
Tibia	918	None	918	16.5
Rear Flipper	429	Tibia & Rear Flipper	673.5	12.1

Lyman et al. (1992) apply their index to phocid samples from a number of archaeological sites. Utility curves are constructed by plotting frequencies of skeletal portions (MAU) on the y-axis against the utility indices on the x-axis. In most cases the MAU values do not correlate with either the %MUI or %MMUI. Some of the reasons suggested for the lack of correlation include the fact that at one site most of the skeletal remains came from newborn seals weighing approximately 6 kg for which logistical decisions about transport would not have been needed. At a site rich in sea lion remains, the lack of correlation was explained in a number of ways. Sea lions are otarids not phocids, having longer forelimbs and less fleshy necks. They suggest that a phocid utility index is not appropriate for otarids. The authors note that there were an over-abundance of sea lion heads at this site. They suggest that heads of sea lions were afforded special

treatment (Lyman et al. 1992:544). Another reason for lack of correlation is that differential preservation has influenced the frequency of parts more than transport or utilization by humans. Nevertheless, the samples from this research demonstrate a correlation between meat utility and frequency of skeletal portions.

To test the likelihood that variability in the faunal assemblages are the result of density mediated destruction, bone mineral density values that have been reported for seal bones are compared to each of the Phillip's Garden West and Phillip's Garden East phocid samples. Chambers (1992; cited in Lyman 1994) conducted photon absorptiometry measurements on seal bones to determine average bone mineral densities for these species. These measurements are approximations of bulk density and are recorded as g/cm^3. A number of locations on elements were scanned to give the range of densities for each element (Figure 7.6 and Table 7.7 in Lyman 1994). Following Hodgetts (1999), I employ the mineral density values for the scan sites of each element that is closest to the zone that determined my MNE values. For instance, if my MNE for humerus was based on the proximal head being most frequent, then I would use the density value for that region (scan site) of the bone. In some instances the bone mineral density values for two scan sites are averaged and used if they are both in the area of the most frequent zone for an element. Scatterplots are presented to show the relationship between density values and the frequency of body parts present in each sample (MAU).

To confirm all the comparative results I present in this chapter, I use Spearman's rho, a statistical method that uses a rank order correlation coefficient to assess the

strength and significance of a rank order relationship (Drennan 1996:228). The correlation coefficient is a value that ranges from 1 to -1, and is expressed as r_s. A perfect positive correlation is 1 and a perfect negative correlation is -1. Values between these two extremes show the extent of a positive or negative correlation. As values approach 0, the correlation is considered weak, and those further from 0 are strong. Significance values are given for each r_s in order to assess confidence that this value is not the result of sampling vagaries (Drennan 1996:231). This value is expressed as *p*. Significance values of 0.1 give 90% confidence that the sample size is appropriate. As *p* values decrease, confidence rises. For instance, a *p* value of 0.001 gives 99.9% confidence that r_s reflects the real correlation between two rankings (Drennan 1996:125).

5.4 Phocid Body Part Frequency: Phillip's Garden West

The following sections detail the relative frequency of elements and groups of elements at Phillip's Garden West over time. The role of meat value and the bone mineral density of the samples is presented with the aim of understanding the subsistence activities at this site. A discussion of the results follows this descriptive section.

5.4.1 Phocid Body Part Frequency: Feature 18

Table 5.3 presents the results of MNE, MAU, and %MAU calculations for all Phocidae elements from Feature 18. Figure 5.1 shows the relative frequency of body parts (MAU). This figure shows that fore limbs, including the front flipper, and hind limbs

including the hind flipper dominate this assemblage, with forelimbs being most numerous, followed by hind limbs, heads, vertebrae, ribs and innominates.

To see how larger articulated portions of the carcass are represented, I grouped elements into seven portions. The MNE values for each element in a group are summed and this number divided into the sum of these elements as they occur in one skeleton. The head consists of the cranium and mandible, the vertebrae are included as a group, ribs remain as a segment, front limbs include the scapula, humerus, radius, and ulna, while the front flipper includes the carpals, metacarpals, and front first and second phalanges. The third phalanges were largely fragmented in all the samples from this study, making it difficult to distinguish front from hind in most cases. For this reason, they are not included in this frequency study. The hind limb includes the innominate, femur, tibia and fibula, and the hind flipper includes the astragalus, calcaneous, tarsals, metatarsals, and hind first and second phalanges. Table 5.4 lists the groups and what elements each includes. Figure 5.2 shows the summed MAU for these element groups. It is clear that fore limbs and front flippers dominate the assemblage, followed by hind limbs and flippers. Heads, vertebrae and ribs are less well represented.

Table 5.3 Phocid MNE, MAU, & %MAU Feature 18 PGW

Element	# in Skeleton	MNE	MAU	%MAU
Cranium	1	5	5	17.2
Mandible	2	18	9	31
Atlas	1	2	2	6.9
Axis	1	3	3	10.4
Cervical	5	22	4.4	15.2
Thoracic	15	34	2.3	7.8
Lumbar	5	19	3.8	13.1
Sacrum	1	6	6	20.7
Ribs	30	89	3	10.2
Scapula	2	25	12.5	43.1
Humerus	2	38	19	65.5
Radius	2	58	29	100
Ulna	2	31	15.5	53.5
Carpal	14	306	21.9	75.5
Metacarpal	10	185	18.5	63.8
Phalange 1 front	10	188	18.8	64.8
Phalange 2 front	8	178	22.3	76.9
Phalanges 3 all	20	252	12.6	43.5
Innominate	2	7	3.5	12.1
Femur	2	27	13.5	46.6
Tibia	2	23	11.5	39.7
Fibula	2	40	20	69
Tarsal	14	164	11.7	40.3
Metatarsal	10	132	13.2	45.5
Phalange 1 hind	10	111	11.1	38.3
Phalange 2 hind	8	92	11.5	39.7
Total	**181**	**2055**	**304.455**	

Table 5.4 Phocid MAU (Summed) Feature 18 PGW

Element Group	MAU	%MAU
Head (Cranium and Mandible)	7.7	37.8
Vertebrae (Atlas, Axis, Cervical, Thoracic, Lumbar, Sacrum)	3.1	15.2
Ribs	3	14.7
Front Limb (Scapula, Humerus, Radius, Ulna)	19	93.1
Front Flipper (Carpal, Metacarpal, Front Phalanges 1 and 2)	20.4	100
Hind Limb (Innominate, Femur, Tibia, Fibula)	12.1	59.3
Hind Flipper (Tarsals, Metatarsal, Hind Phalanges 1 and 2)	11.9	58.3

Figure 5.1 Phocid MAU Feature 18, Phillip's Garden West

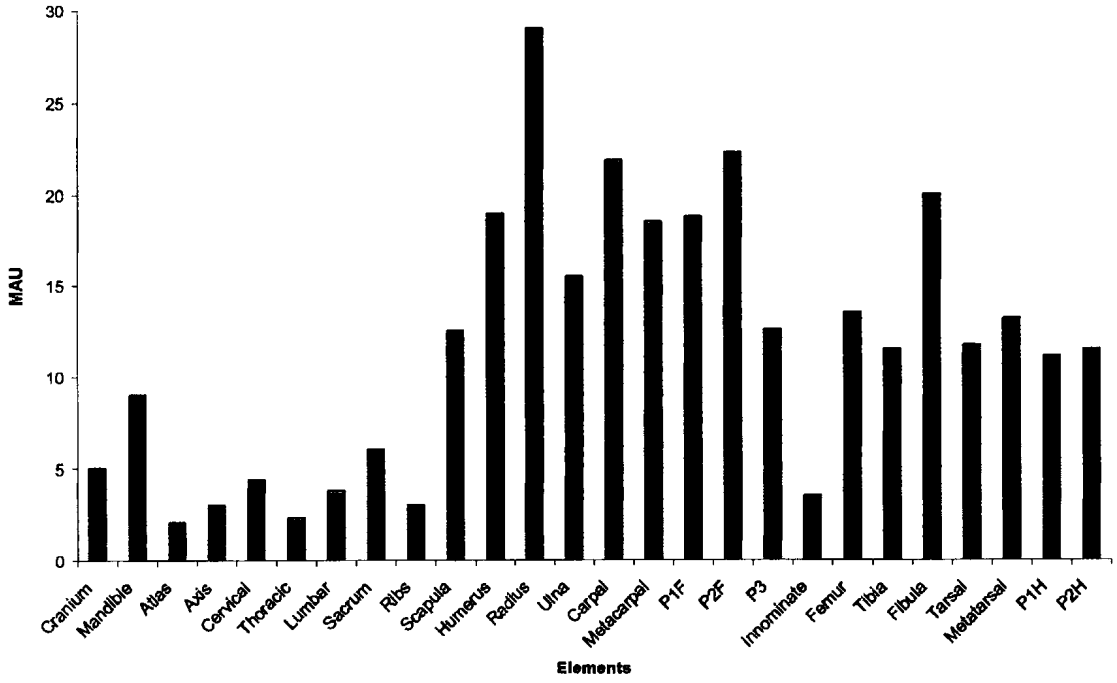
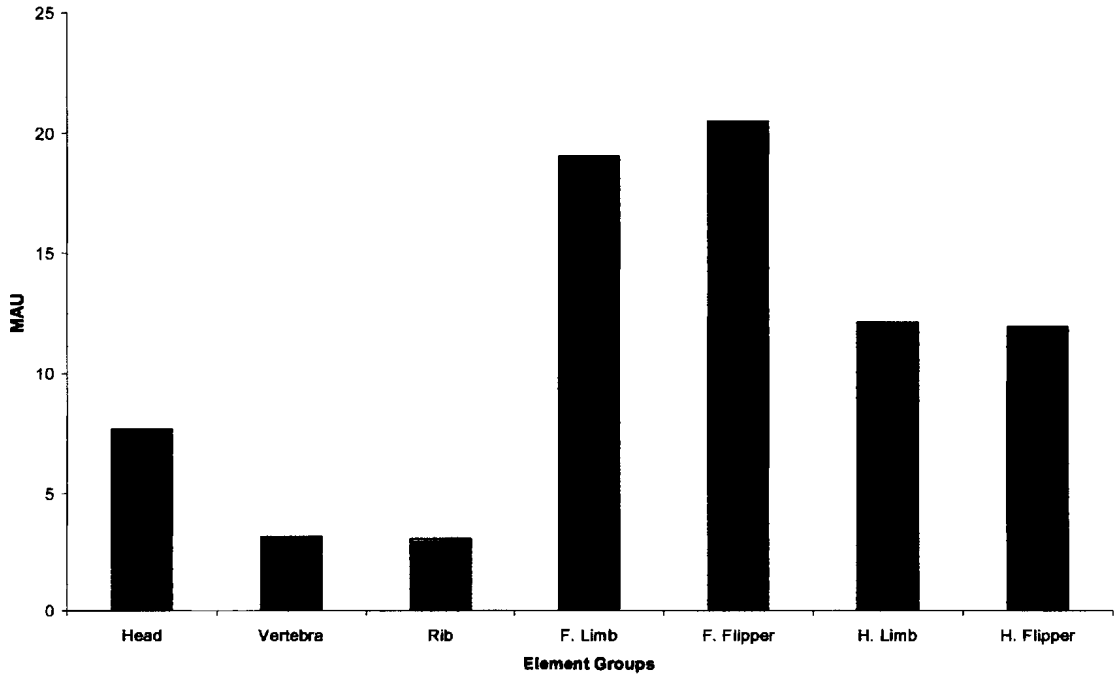


Figure 5.2 Phocid MAU (Summed) Feature 18, Phillip's Garden West



5.4.2 Phocid Body Part Frequency: Feature 5A-5D

With some slight variation a similar phocid body part frequency as Feature 18 was noted for Feature 5A-5D at Phillip's Garden West. Table 5.5 details the MNE, MAU and %MAU for the phocids in this sample. Figure 5.3 shows the MAU of the elements. As in Feature 18, there are a relatively high number of front limbs and flippers, followed by hind limbs, especially the tibia and fibula. There are relatively equal numbers of hind flippers, crania and axis vertebrae as well as scapulae and ulnae. There are very low proportions of all vertebrae, ribs and innominates. When these elements are grouped (Figure 5.4) limb bones dominate, with front flippers being most frequent, followed by equal proportions of fore and hind limbs, and finally hind flippers. Heads are much less frequent and vertebrae and ribs are represented very slightly.

Table 5.5 Phocid MNE, MAU, %MAU Feature 5A-5D PGW

Element	# in Skeleton	MNE	MAU	% MAU
Cranium	1	2	2	33.9
Mandible	2	2	1	17
Atlas	1	1	1	17
Axis	1	2	2	33.9
Cervical	5	2	0.4	6.8
Thoracic	15	2	0.1	2.2
Lumbar	5	1	0.2	3.4
Sacrum	1	0	0	0
Ribs	30	5	0.2	2.9
Scapula	2	4	2	33.9
Humerus	2	6	3	50.9
Radius	2	10	5	84.8

Element	# in Skeleton	MNE	MAU	% MAU
Ulna	2	4	2	33.9
Carpal	14	39	2.8	66.1
Metacarpal	10	59	5.9	100
Phalange 1	10	35	3.5	59.3
Phalange 2	8	30	3.8	64.4
Phalanges 3	20	53	2.7	45.8
Innominate	2	1	0.5	8.5
Femur	2	3	1.5	25.4
Tibia	2	9	4.5	76.3
Fibula	2	11	5.5	93.2
Tarsal	14	29	2.1	49.2
Metatarsal	10	24	2.4	40.7
Phalange 1	10	19	1.9	32.2
Phalange 2	8	18	2.3	39
Total	181	371	58.1	

Table 5.6 Phocid MAU (Summed) Feature 5A-5D PGW

Element Group	MAU	%MAU
Head (Cranium and Mandible)	1.3	33.3
Vertebrae (Atlas, Axis, Cervical, Thoracic, Lumbar, Sacrum)	0.3	7.7
Ribs	0.2	5.1
Front Limb (Scapula, Humerus, Radius, Ulna)	3	76.9
Front Flipper (Carpal, Metacarpal, Front Phalanges 1 and 2)	3.9	100
Hind Limb (Innominate, Femur, Tibia, Fibula)	3	76.9
Hind Flipper (Tarsals, Metatarsal, Hind Phalanges 1 and 2)	2.1	53.9

Figure 5.3 Phocid MAU Feature 5A-5D, Phillip's Garden West

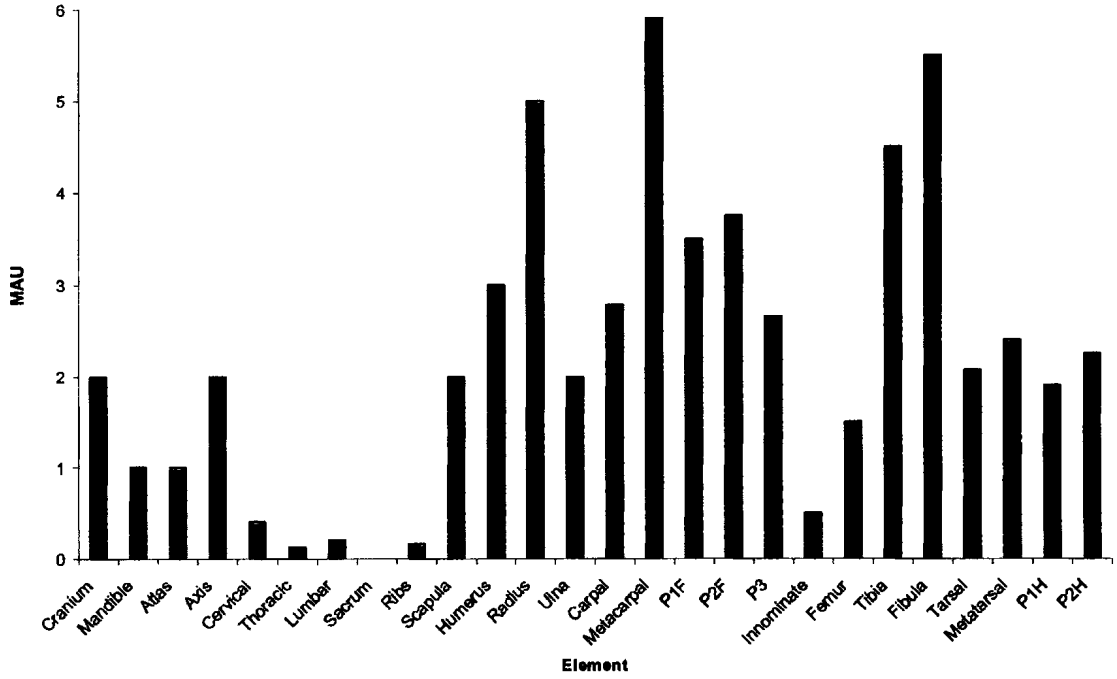
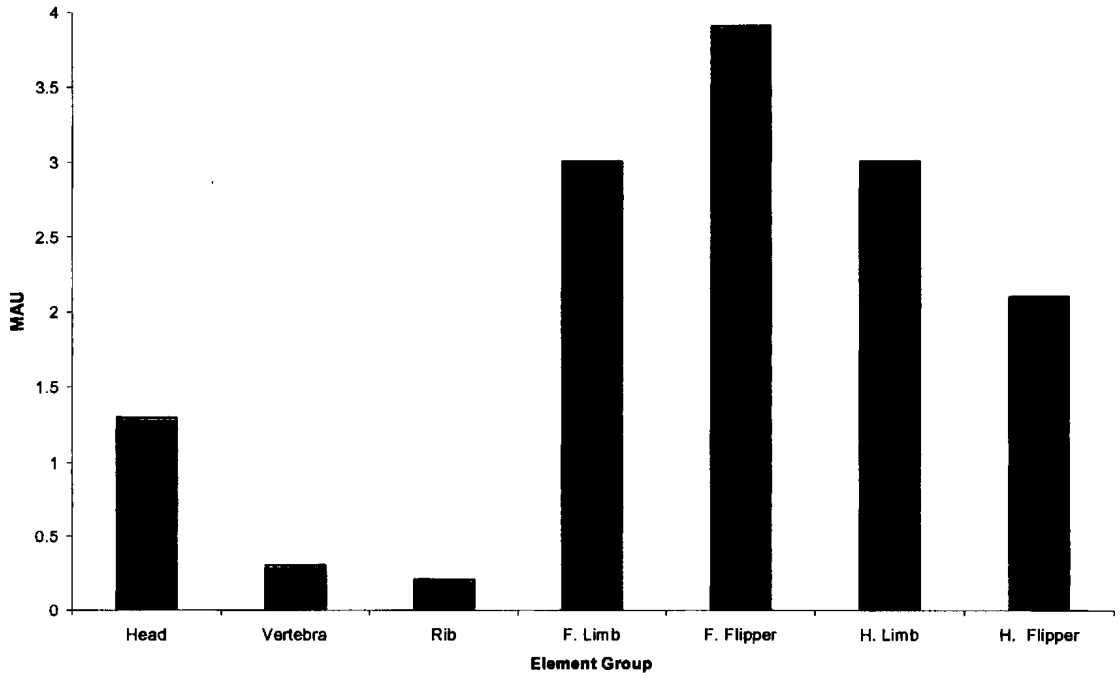


Figure 5.4 Phocid MAU (Summed) Feature 5A-5D, Phillip's Garden West



5.4.3 Phocid Body Part Frequency: Feature 5E

There is some deviation from the pattern of body part frequency in Feature 5E compared to both Feature 18 and Feature 5A-5D (Table 5.7, Figure 5.5.) Crania are the most frequent elements in the sample; otherwise, like the other Phillip's Garden West samples, there are very few axial elements. There are a greater number of proximal limb bones (humerus, radius, ulna, femur, tibia, fibula) compared to distal appendicular elements (flippers). The only exception is the metatarsals, which are relatively well represented. Nevertheless, with the exception of vertebrae and ribs, most element groups are fairly equally represented. This configuration is even more obvious when the elements are represented as summed MAU (Table 5.8, Figure 5.6). Five of the seven element groups fall between 2 and 3.5 MAU. The high frequency of heads is striking when compared to the other Phillip's Garden West samples. Only the front limb bones including the humerus, radius, ulna and carpals are more highly represented. The head and hind limbs are equally represented followed by hind and front flippers. Once again the least well represented elements are the vertebrae and ribs.

Table 5.7 PGW Feature 5E Phocid MNE, MAU, %MAU

Element	# in Skeleton	MNE	MAU	% MAU
Cranium	1	7	7	100
Mandible	2	2	1	14.3
Atlas	1	1	1	14.3
Axis	1	1	1	14.3
Cervical	5	2	0.4	5.7
Thoracic	15	5	0.3	4.8
Lumbar	5	1	0.2	2.9

Element	# in Skeleton	MNE	MAU	% MAU
Sacrum	1	0	0	0
Ribs	30	3	0.1	1.4
Scapula	2	4	2	28.6
Humerus	2	6	3	42.9
Radius	2	12	6	85.7
Ulna	2	6	3	42.9
Carpal	14	35	2.5	35.7
Metacarpal	10	22	2.2	31.4
Phalange 1 front	10	18	1.8	25.7
Phalange 2 front	8	12	1.5	21.4
Phalanges 3 all	20	37	1.9	26.4
Innominate	2	2	1	14.3
Femur	2	6	3	42.9
Tibia	2	10	5	71.4
Fibula	2	6	3	42.9
Tarsal	14	22	1.6	22.4
Metatarsal	10	41	4.1	58.6
Phalange 1 hind	10	31	3.1	44.3
Phalange 2 hind	8	9	1.1	16.1
Total	181	301	56.8	

Table 5.8 PGW Feature 5E Phocid MAU (Summed)

Element Group	MAU	%MAU
Head (Cranium and Mandible)	3	85.7
Vertebrae (Atlas, Axis, Cervical, Thoracic, Lumbar, Sacrum)	0.4	11.4
Ribs	0.1	2.9
Front Limb (Scapula, Humerus, Radius, Ulna)	3.5	100
Front Flipper (Carpal, Metacarpal, Front Phalanges 1 and 2)	2.1	60
Hind Limb (Innominate, Femur, Tibia, Fibula)	3	85.7
Hind Flipper (Tarsals, Metatarsal, Hind Phalanges 1 and 2)	2.5	71.4

Figure 5.5 Phocid MAU Feature 5E, Phillip's Garden West

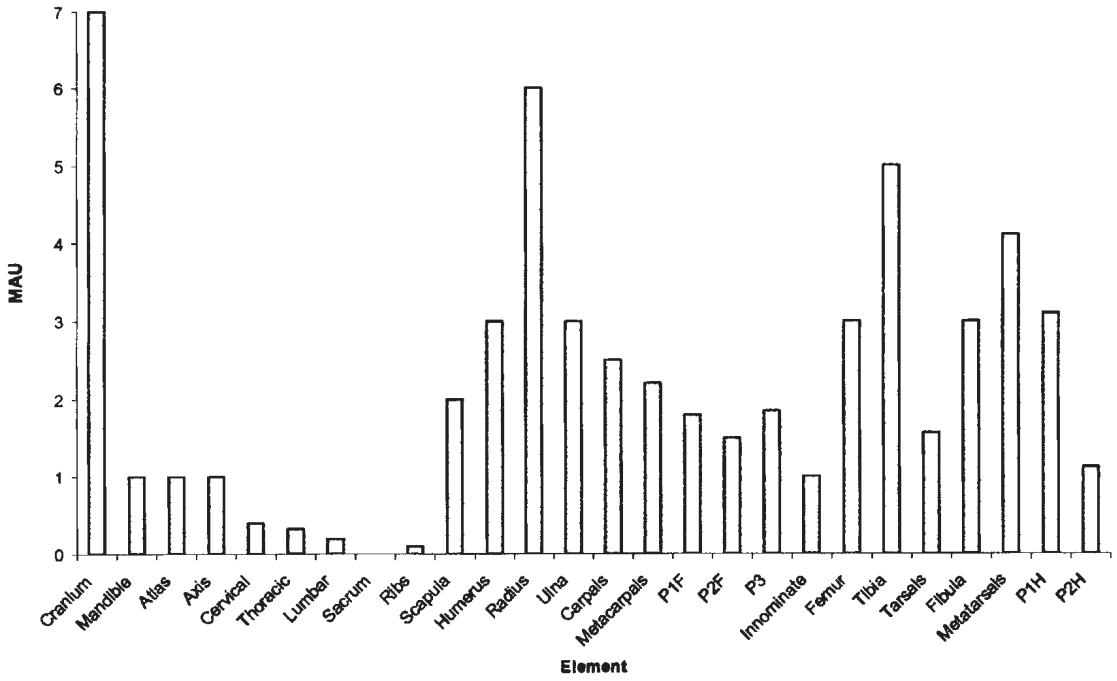
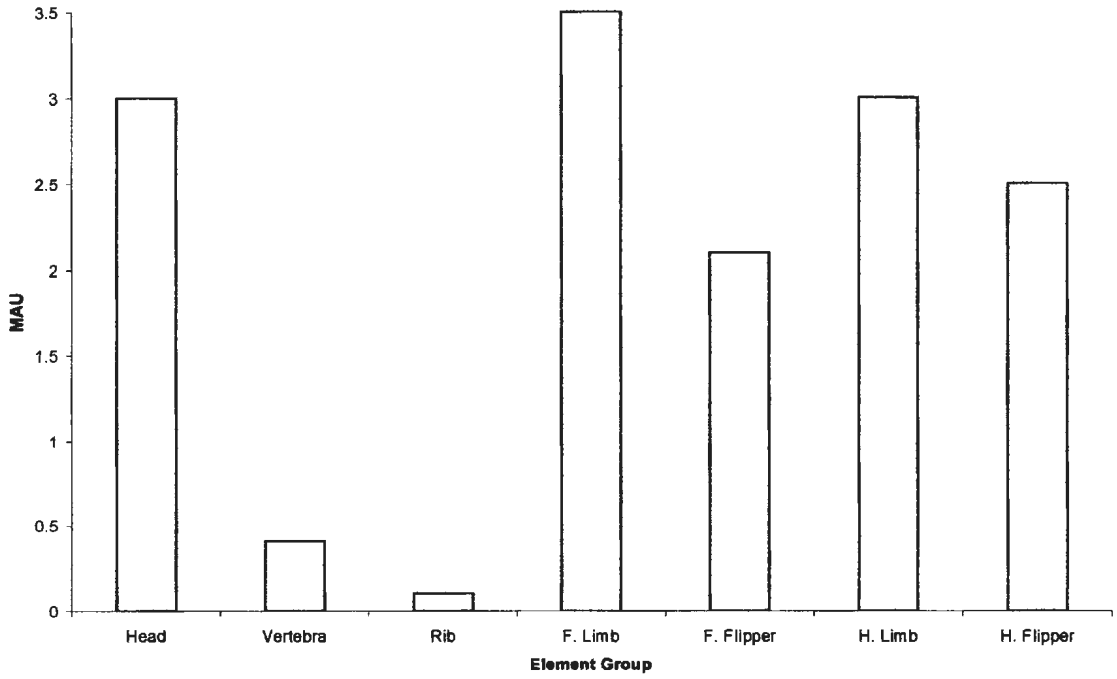


Figure 5.6 Phocid MAU (Summed) Feature 5E, Phillip's Garden West



5.5 Meat Utility of Phocid Body Parts: Phillip's Garden West

When the MAU values for all the faunal samples from Phillip's Garden West were plotted against the %MUI and %MMUI derived by Lyman et al. (1992), there was an L-shaped configuration which Binford (1978) referred to as a reverse utility strategy. This simply means that elements of high meat value were relatively low in number, while those of low meat value were relatively frequent. This configuration is commonly associated with kill locations (Binford 1978). Figures 5.7-5.12 illustrate the relationship between body part frequency and both %MUI and %MMUI at this site. When elements are grouped, the L-shaped appearance of the scatterplot becomes more apparent and the correlation becomes stronger. Lyman et al. (1992:548) suggest that the stronger correlation with the modified meat utility index suggests that seal carcasses may have been transported in units that include a number of elements.

5.5.1 Feature 18: MAU Values Against %MUI and %MMUI

Table 5.9 gives the MAU values for Feature 18 as well as the %MUI and %MMUI values derived by Lyman et al. (1992). Note that the MAU values have been recalculated to provide values for the element groups described by Lyman et al. (1992). This was accomplished by summing the MNE values of each of the elements in the group, then dividing by the sum of the number of these elements in the skeleton. Figure 5.7 illustrates the scatterplot of the relationship of MAU against %MUI. It is clear that the more meat-rich portions of the skeleton are the least numerous in this sample (r_s=-0.5, p <0.05). This

somewhat weak negative correlation becomes much stronger when elements are grouped to account for riders and MAU values are plotted against %MMUI. In this case, r_s=-0.84 and p< 0.001. Figure 5.8 illustrates this correlation.

Table 5.9 MAU Values from Feature 18 Against %MUI and %MMUI for Phocids

Skeletal Part	%MUI	MAU Frequency Feature 18	Parts Averaged	%MMUI
Head (He)	27.4	7.7	Head & Cervical (He/Ce)	31.6
Cervical (Ce)	35.8	3.9	None (Ce)	35.8
Thoracic (Th)	24.9	2.3	Thoracic & Rib (Th/Rb)	62.4
Lumbar (Lu)	32.9	3.8	Lumbar & Pelvis (Lu/Pv)	38.7
Pelvis (PV)	44.5	3.5	None (PV)	44.5
Rib (Rb)	100	3	None(Rb)	100
Sternum (St)	2.7	0	Rib & Sternum (Rb/St)	51.4
Scapula (Sc)	19.8	12.5	Rib & Scapula (Rb/Sc)	59.9
Humerus (He)	10.7	19	Scapula & Humerus (Sc/He)	15.2
Radius/Ulna (R/U)	4.8	22.3	Humerus & Radius/Ulna (He/R/U)	7.7
Front Flipper (FF)	2.3	20.4	Radius/Ulna & Front Flipper (R/U/FF)	3.6
Femur (Fe)	4.5	13.5	Pelvis & Tibia/fibula (PV/T/F)	30.5
Tibia/fibula (T/F)	16.5	15.8	None (T/F)	16.5
Rear Flipper (RF)	7.7	11.9	Tibia/fibula & Rear Flipper (T/F/RF)	12.1

Figure 5.7 Scatterplots of MAU Frequencies of Phocids from Feature 18, Phillip's Garden West Against %MUI

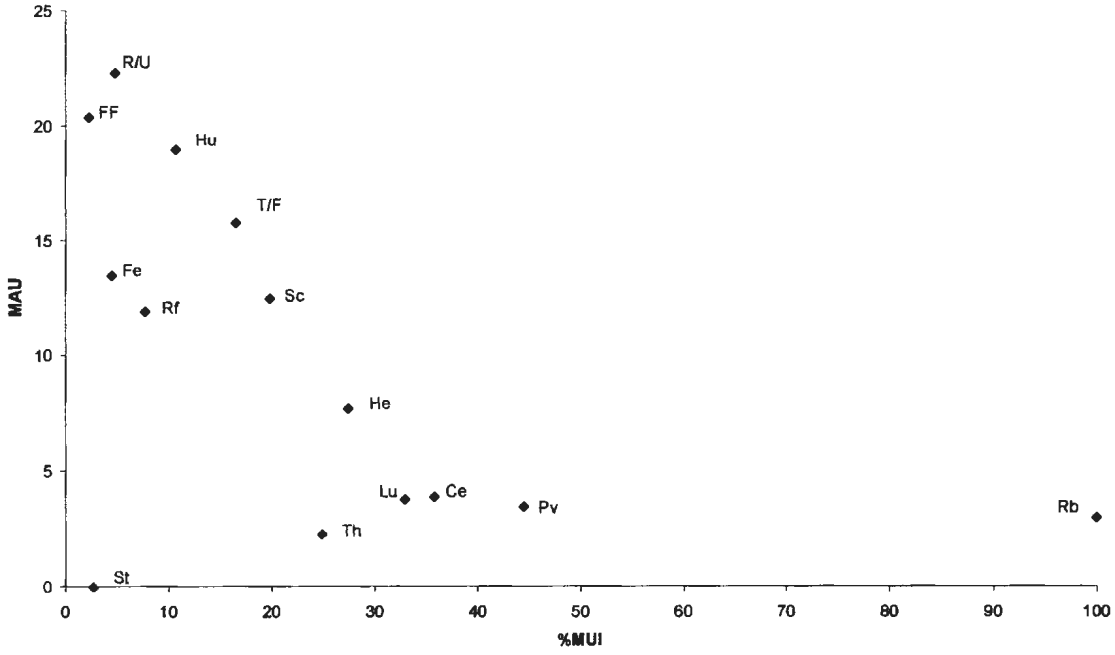
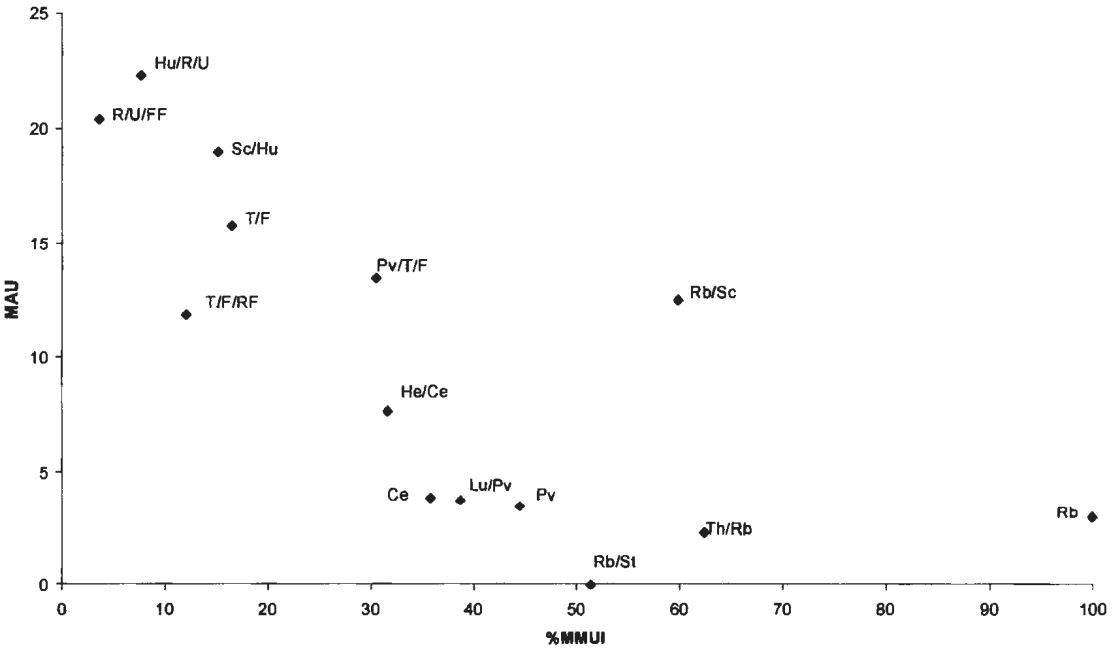


Figure 5.8 Scatterplot of MAU Frequencies of Phocids from Feature 18, Phillip's Garden West Against %MMUI



5.5.2 Feature 5A-5D: MAU Values Against %MUI and %MMUI

Table 5.10 gives the MAU values from Feature 5A-5D against the % MUI and %MMUI values for phocids. The scatterplot in Figure 5.9 shows the negative correlation between the MAU and the %MUI. This correlation is a somewhat weak negative, r_s=-0.4, p= 0.01, but becomes much stronger when elements are grouped to account for riders, r_s=-0.82, p< 0.001 (Figure 5.10). Again this analysis demonstrates an absence of high meat value portions of phocids, compared to low meat value parts of the skeleton.

Table 5.10 MAU Values from Feature 5A-5D Against %MUI and %MMUI for Phocids

Skeletal Part	%MUI	MAU Frequency Feature 5A-5D	Parts Averaged	%MMUI
Head (He)	27.4	1.3	Head & Cervical (He/Ce)	31.6
Cervical (Ce)	35.8	0.7	None (Ce)	35.8
Thoracic (Th)	24.9	0.1	Thoracic & Rib (Th/Rb)	62.4
Lumbar (Lu)	32.9	0.2	Lumbar & Pelvis (Lu/PV)	38.7
Pelvis (PV)	44.5	0.5	None (PV)	44.5
Rib (Rb)	100	0.2	None (Rb)	100
Sternum (St)	2.7	0	Rib & Sternum (Rb/St)	51.4
Scapula (Sc)	19.8	2	Rib & Scapula (Rb/Sc)	59.9
Humerus (He)	10.7	3	Scapula & Humerus (Sc/He)	15.2
Radius/Ulna (R/U)	4.8	3.5	Humerus & Radius/Ulna (He/R/U)	7.7
Front Flipper (FF)	2.3	3.9	Radius/Ulna & Front Flipper (R/U/FF)	3.6
Femur (Fe)	4.5	1.5	Pelvis & Tibia/Fibula (PV/T/F)	30.5
Tibia/Fibula (T/F)	16.5	5	None (T/F)	16.5
Rear Flipper (RF)	7.7	2.1	Tibia/Fibula & Rear Flipper (T/F/RF)	12.1

Figure 5.9 Scatterplot of MAU Frequencies of Phocids from Feature 5A-5D, Phillip's Garden West Against %MUI

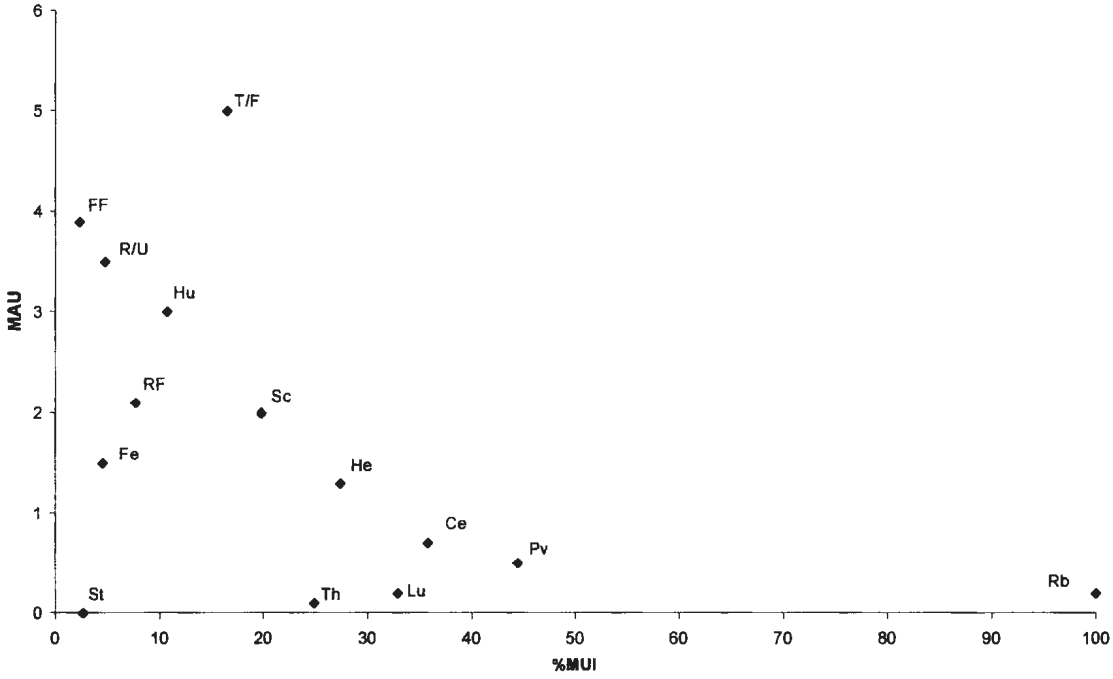
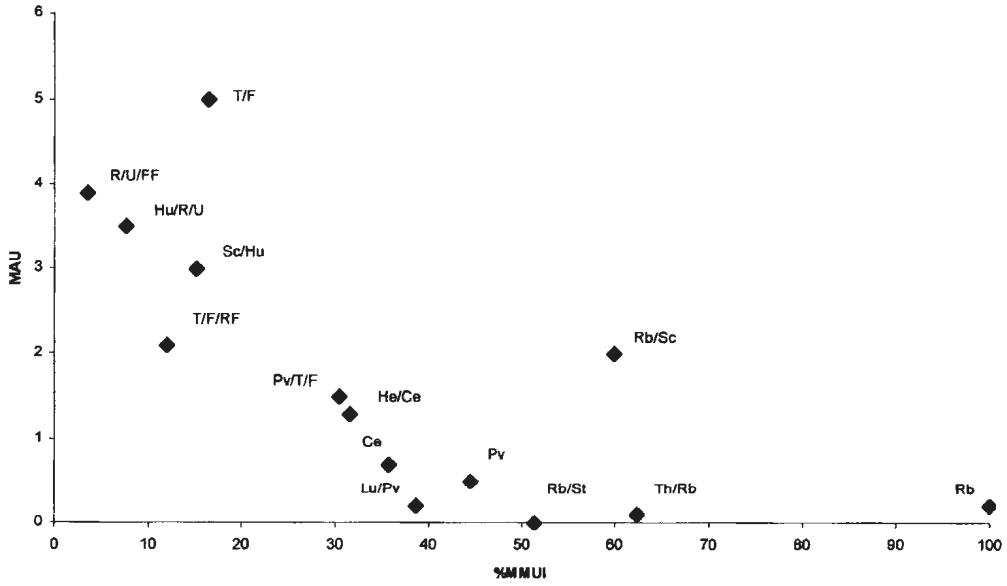


Figure 5.10 Scatterplot of MAU Frequencies of Phocids from Feature 5A-5D, Phillip's Garden West Against %MMUI



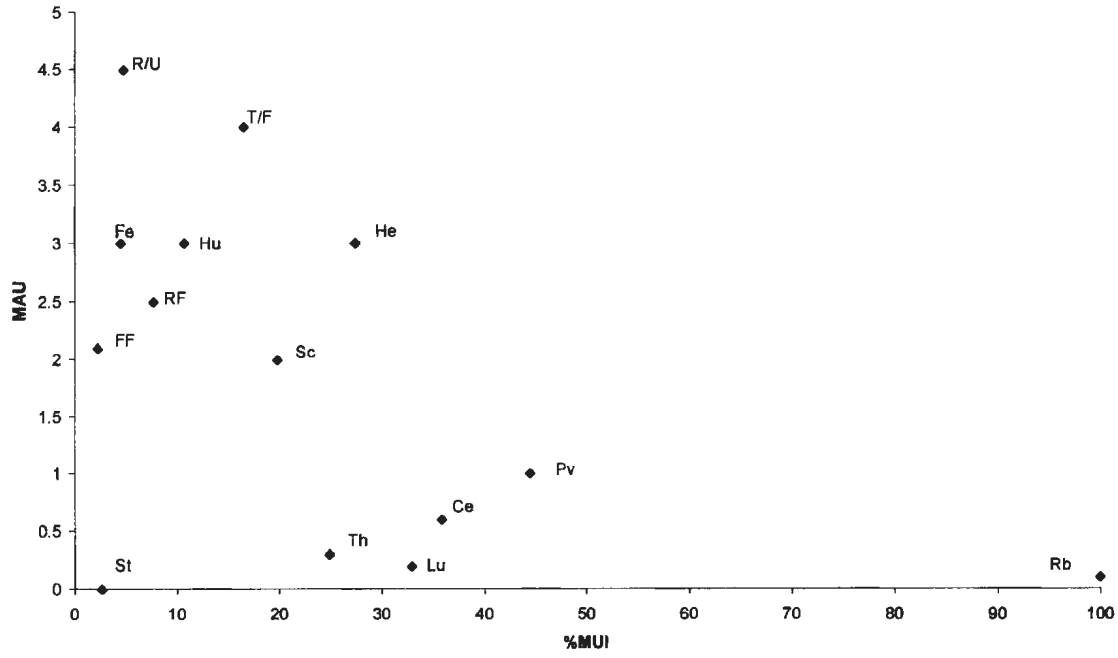
5.5.3 Feature 5E: Phocid MAU Values Against %MUI and %MMUI

Table 5.11 details the frequency of the phocid bones (MAU) against the %MUI and %MMUI for Feature 5E. Figure 5.11 shows a somewhat weak negative correlation between the %MUI and MAU for phocids in this sample (r_s=-0.4, p <0.2). The negative correlation becomes stronger, as illustrated in Figure 5.12 when elements are grouped and MAU is plotted against %MMUI (r_s=-0.75, p <0.002). Body parts of low meat value are less frequent, while those of low meat value are relatively more frequent.

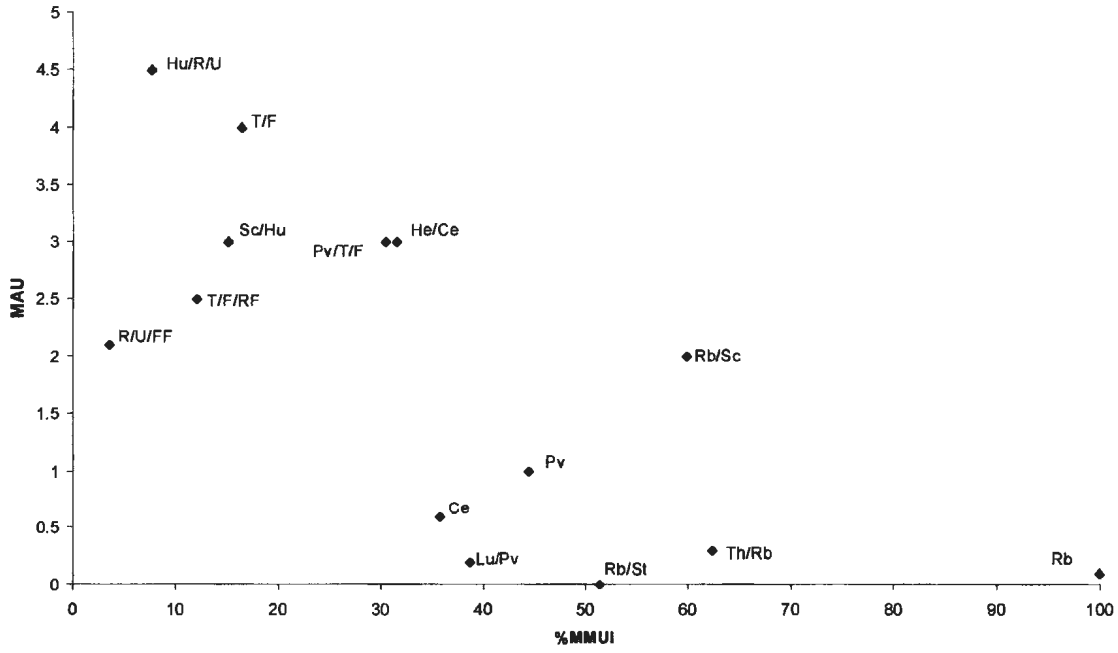
Table 5.11 Phocids MAU Values from Feature 5E Against %MUI and %MMUI

Skeletal Part	%MUI	MAU Frequency	Parts Averaged	%MMUI
Head (He)	27.4	3	Head & Cervical (He/Ce)	31.6
Cervical (Ce)	35.8	0.6	None (Ce)	35.8
Thoracic (Th)	24.9	0.3	Thoracic & Rib (Th/Rb)	62.4
Lumbar (Lu)	32.9	0.2	Lumbar & Pelvis (Lu/PV)	38.7
Pelvis (PV)	44.5	1	None (PV)	44.5
Rib (Rb)	100	0.1	None (Rb)	100
Sternum (St)	2.7	0	Rib & Sternum (Rb/St)	51.4
Scapula (Sc)	19.8	2	Rib & Scapula (Rb/Sc)	59.9
Humerus (He)	10.7	3	Scapula & Humerus (Sc/He)	15.2
Radius/Ulna (R/U)	4.8	4.5	Humerus & Radius/Ulna (He/R/U)	7.7
Front Flipper (FF)	2.3	2.1	Radius/Ulna & Front Flipper (R/U/FF)	3.6
Femur (Fe)	4.5	3	Pelvis & Tibia/Fibula (PV/T/F)	30.5
Tibia/Fibula (T/F)	16.5	4	None (T/F)	16.5
Rear Flipper (RF)	7.7	2.5	Tibia/Fibula & Rear Flipper (T/F/RF)	12.1

Figure 5.11 Scatterplot of MAU Frequencies of Phocids from Feature 5E, Phillip's Garden West Against %MUI



Figur 5.12 Scatterplot of MAU Frequencies of Phocids from Feature 5E, Phillip's Garden West Against %MMUI



5.6 Bone Mineral Density of Phocid Body Parts: Phillip's Garden West

Figures 5.13-5.15 show the scatterplots of MAU frequencies of phocids from the Phillip's Garden West features against bone mineral density values for seals derived by Chambers (1992; cited in Lyman 1994). As mentioned above, I used the bone mineral density values for the scan sites that correspond to the most frequently occurring zone for each of the elements in each feature. Therefore, if the most frequent zone for an element was different for the different features, the bone mineral density values would not be the same. Generally the results of these comparisons demonstrate that the density of the bones is positively correlated with their frequency. This relationship is stronger or weaker depending on the samples, with some interesting anomalies.

5.6.1 Bone Mineral Density Values and Body Part Frequency at Feature 18, Phillip's Garden West.

Table 5.12 shows the bone mineral density values from Lyman (1994:248) with the MAU values for the same elements in Feature 18. These values are plotted against one another to see the correlation between the two and presented in Figure 5.13. Spearman's rho calculations for this feature demonstrate a positive correlation (r_s=0.59, p< 0.02). This suggests that variability in the density of phocid elements may account to some extent for the configuration of body parts in the assemblage from this feature.

Table 5.12 Bone Mineral Density Values (from Lyman 1994:248) and MAU Values for Feature 18, Phillip's Garden West

Element	Scan Site	Bone Mineral Density	MAU
Mandible (Mn)	Average (DN1, DN2, DN3)	0.78	9
Thoracic Vertebra (Th)	TH1	0.34	2.3
Lumbar Vertebra (Lu)	LU1	0.38	3.8
Sacrum (Sa)	Average (SC1, SC2)	0.39	6
Rib (Rb)	Average (RI1, RI2)	0.45	3
Scapula (Sc)	Average (SP1, SP2)	0.49	12.5
Humerus (He)	HU5	0.6	19
Radius (Ra)	RA1	0.63	29
Ulna (Ul)	UL3	0.35	15.5
Innominate (In)	AC1	0.47	3.5
Femur (Fe)	FE1	0.5	13.5
Tibia(Ti)	TI5	0.48	11.5
Fibula (Fi)	FI5	0.76	20
Astragalus (As)	Average (AS1, AS2)	0.5	8
Calcaneum (Ca)	Average (CA1, CA2)	0.45	3

A few of the elements in Figure 5.13 do not fit the overall trend. Despite the fact that the ulna has a relatively low bone mineral density value, it is relatively frequent. Conversely, the mandible has the highest bone mineral density value, yet it is relatively infrequently represented in the feature.

5.6.2 Bone Mineral Density Values and Body Part Frequency at Feature 5A-5D, Phillip's Garden West.

Table 5.13 shows the bone mineral density values from Chambers (1992; cited in Lyman 1994) and the MAU values for Feature 5A-5D. These values are plotted against one another to illustrate correlation (Figure 5.14). Spearman's rho calculations demonstrate a positive correlation (r_s=0.59, p=.02). Again, a number of the elements do not fit the overall trend. The ulna and tibia are more frequently represented than would be

expected from their relatively low bone mineral density values. As in Feature 18, there is a very low frequency of mandibles despite their high bone mineral density values. There is also a very low representation of innominates despite the fact that their bone mineral densities are about the same value as the radius which is highly represented.

Table 5.13 Bone Mineral Density Values (from Lyman 1994:248) and MAU Values for Feature 5A-5D, Phillip's Garden West

Element	Scan Site	Bone Mineral Density	MAU
Mandible (Mn)	Average (DN1, DN2, DN3)	0.78	1
Thoracic Vertebra (Th)	TH1	0.34	0.1
Lumbar Vertebra (Lu)	LU1	0.38	0.2
Sacrum (Sa)	Average (SC1, SC2)	0	0
Rib (Rb)	Average (RI1, RI2)	0.45	0.2
Scapula (Sc)	SP3	0.61	2
Humerus (He)	HU5	0.6	3
Radius (Ra)	RA1	0.63	5
Ulna (Ul)	UL3	0.35	2
Innominate (In)	Aver (IL1, IL2, AC1, PU1, PU2)	0.62	0.5
Femur (Fe)	FE6	0.57	1.5
Tibia (Ti)	TI5	0.48	4.5
Fibula (Fi)	FI5	0.76	5.5
Astragalus (As)	Average (AS1, AS2)	0.5	1.5
Calcaneum (Ca)	Average (CA1, CA2)	0.45	2

Figure 5.13 Scatterplot of MAU Frequencies of Phocids for Feature 18, Phillip's Garden West Against Bone Mineral Density Values for Seals

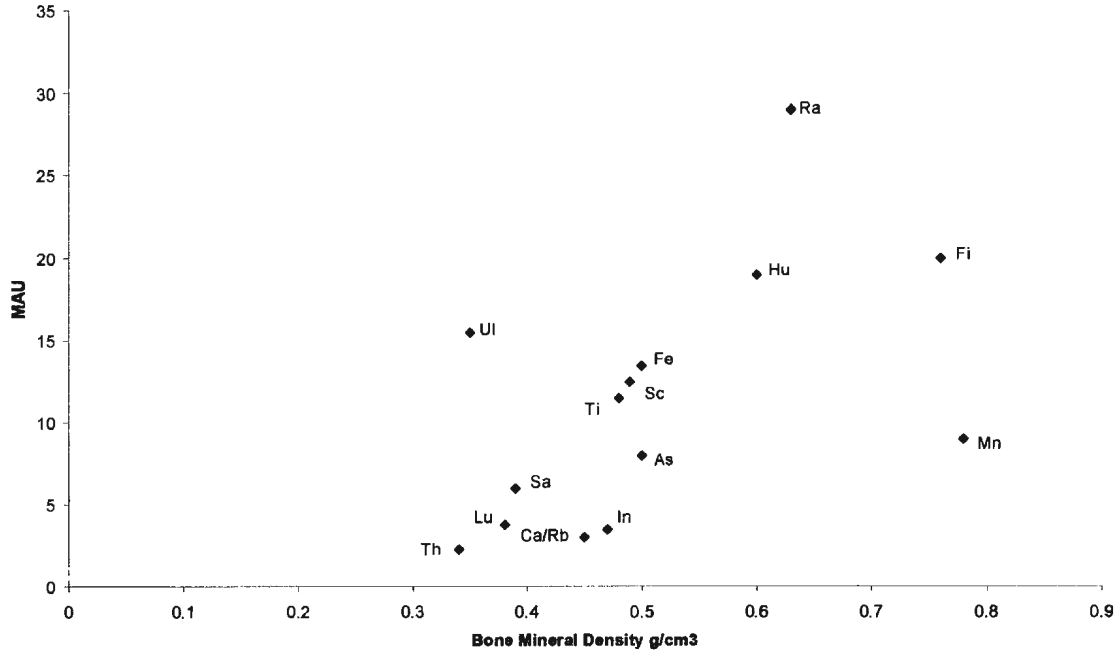
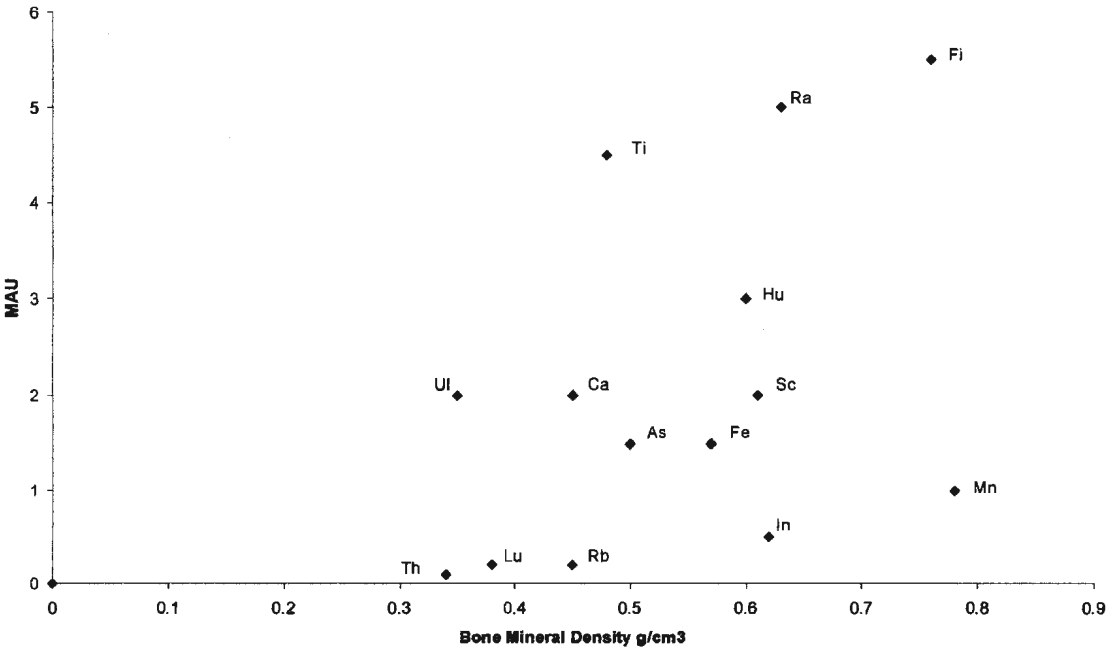


Figure 5.14 Scatterplot of MAU Frequencies of Phocids for Feature 5A-5D, Phillip's Garden West Against Bone Mineral Density Values for Seals



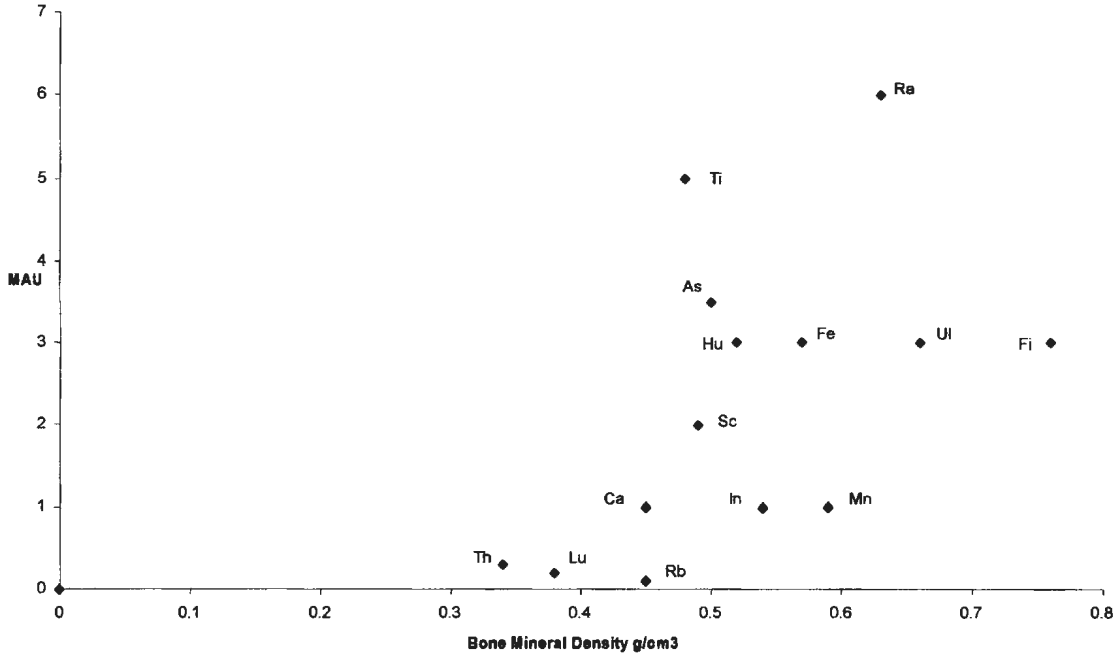
5.6.3 Bone Mineral Density Values and Body Part Frequency at Feature 5E, Phillip's Garden West

Table 5.14 shows the scan site values for bone mineral density and the MAU values for the phocid elements in Feature 5E. There is a positive and significant correlation between these variables as is illustrated in Figure 5.15 (r_s=.65, p=.009). Nevertheless, the frequency of innominate, ulna, fibula and mandible are relatively low despite their high density values.

Table 5.14 Bone Mineral Density Values (from Lyman 1994:248) and MAU Values for Feature 5E, Phillip's Garden West

Element	Scan Site	Bone Mineral Density	MAU
Mandible (Mn)	DN1	0.59	1
Thoracic Vertebra (Th)	TH1	0.34	0.3
Lumbar Vertebra (Lu)	LU1	0.38	0.2
Sacrum (Sa)	NA	0	0
Rib (Rb)	Average (RI1, RI2)	0.45	0.1
Scapula (Sc)	SP1	0.49	2
Humerus (He)	Average (HU1, HU5)	0.52	3
Radius (Ra)	RA1	0.63	6
Ulna (Ul)	UL2	0.66	3
Innominate (In)	Average (IL1, AC1)	0.54	1
Femur (Fe)	FE6	0.57	3
Tibia (Ti)	TI5	0.48	5
Fibula (Fi)	FI5	0.76	3
Astragalus (As)	Average (AS1, AS2)	0.5	3.5
Calcaneum (Ca)	Average (CA1, CA2)	0.45	1

Figure 5.15 Scatterplot of MAU Frequencies of Phocids for Feature 5E, Phillip's Garden West Against Bone Mineral Density Values for Seals

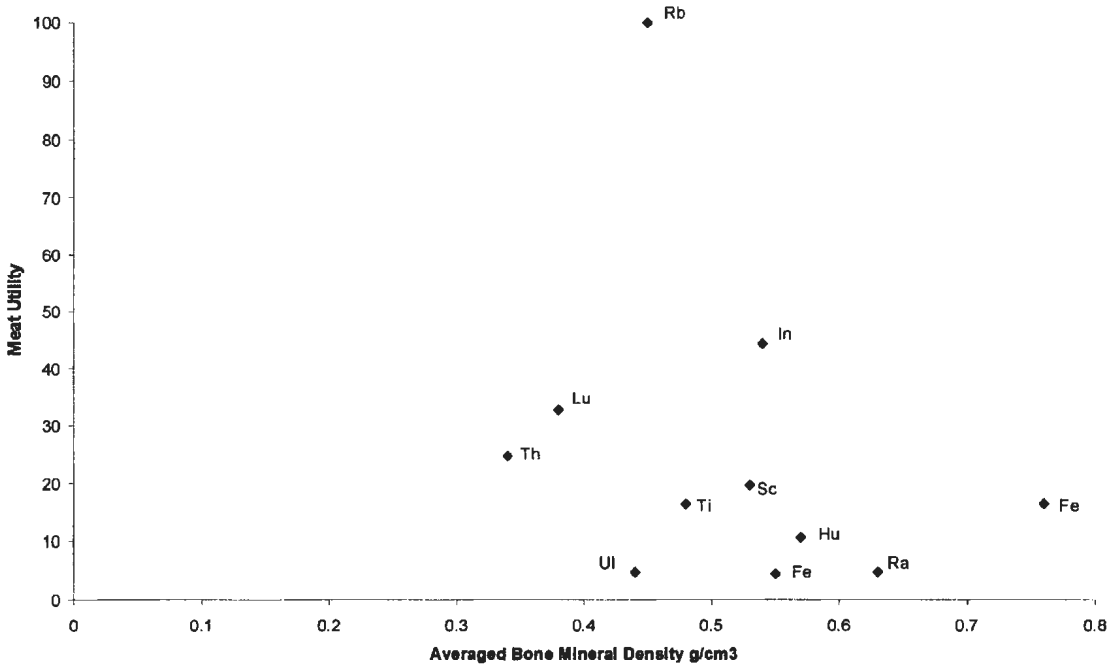


5.7 Body Part Frequency Phillip's Garden West Intra-site Variability

Sections 5.4 - 5.6 presented the quantification of body parts and the correlation of body part frequency to the meat utility and bone mineral density of the various parts. In this section I present the frequency information of all three samples to illustrate the similarities and differences among the samples, and from a number of sources of evidence, offer an interpretation of the results.

Lyman (1994:258) points out that when both transport or utility indices as well as bone mineral density values are used in comparisons to MAU values from a site, it may not be possible to differentiate which method, or to what extent both methods best account for the frequency of faunal remains if both show significant results. This is the case in the present study. Lyman (1994:258) states that there tends to be a negative correlation between utility indices and bone mineral density. This indicates that bones with low structural density tend to rank high in utility, while bones with high structural density tend to rank low in utility. Since utility is assumed to be directly related to decisions about transport, this presents a problem of interpreting whether transport or structural density are influencing the body part frequency seen in the faunal assemblages. Figure 5.16 shows the relationship between the meat utility index and the average bone mineral density values of all the scan sites for each element in each sample at Phillip's Garden West. The correlation is a weak negative (r_s=-.45, p<.2).

Figure 5.16 Scatterplot of Meat Utility Values Against Averaged Density Values for Samples From Phillip's Garden West



Lyman (1984:258) suggests that other lines of evidence are necessary to aid in sorting out what process(es), (transport or destruction), are responsible for a particular faunal assemblage. A review of the evidence for both transport and density mediated destruction will follow with an evaluation of each. In addition, evidence such as site features and artifact configuration, site location, hunting practices, species morphology and the possible ritual dimension of animal treatment will be considered in the interpretation of the configuration of the faunal assemblage at this site.

To understand the extent of the similarities and differences between the samples from Phillip's Garden West, MAU values are ranked against one another and Spearman's rho calculations are performed. Table 5.15 gives the results of Spearman's rho calculations between each of the samples. There is an overall strong and highly significant correlation among the samples suggesting that there are general similarities in the frequency of elements. This correlation is particularly strong between Feature 18 and Feature 5A-5D. Despite this overall trend, there are some differences between the samples from this site, as reflected in the weaker correlation between Feature 5E and the other two samples.

Table 5.15 Spearman's rho Calculations of MAU Values for Phocids in Features from Phillip's Garden West

	Feature 5A-5D	Feature 5E
Feature 18	r_s=.8, p<.001	r_s=.61, p<.001
Feature 5A-5D		r_s=.68, p<.001

Figure 5.17 shows the %MAU of all three phocid samples from Phillip's Garden West. Figure 5.18 shows the summed %MAU values of the three samples to display how portions of the skeleton, or element groups, compared to one another. There are a number of similarities and a few differences. All the samples are low in ribs and vertebrae, while limb and flipper bones are relatively frequent. Looking at the appendicular skeleton there are a few differences. Features 18 and 5E have more fore limbs than hind limbs, while Feature 5A-5D have equal relative frequencies of fore and hind limbs. There are more front flippers than hind in Features 18 and 5A-5D, and more hind flippers in Feature 5E. Overall, Features 18 and 5A-5D are dominated by front limbs, front flippers and hind limbs and flippers, while Feature 5E is dominated by heads and limbs, followed by flippers.

Figure 5.17 Phillip's Garden West Phocid %MAU

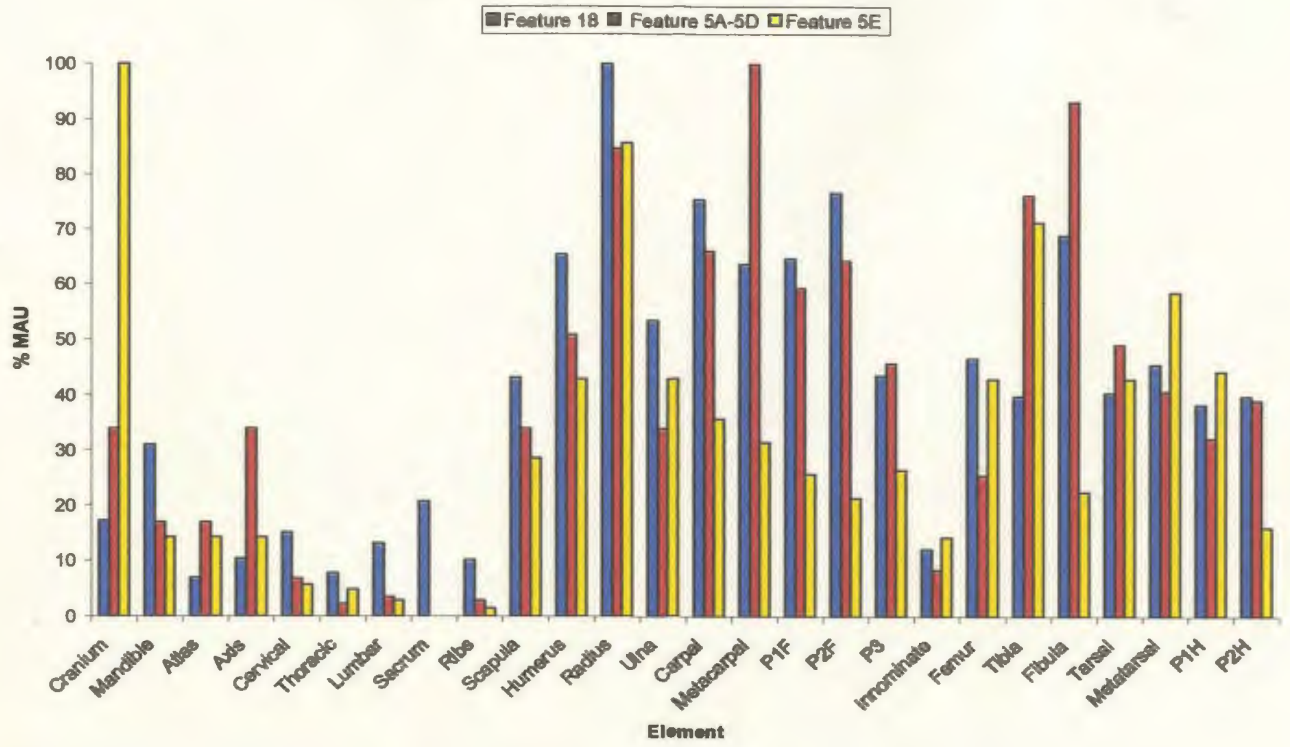
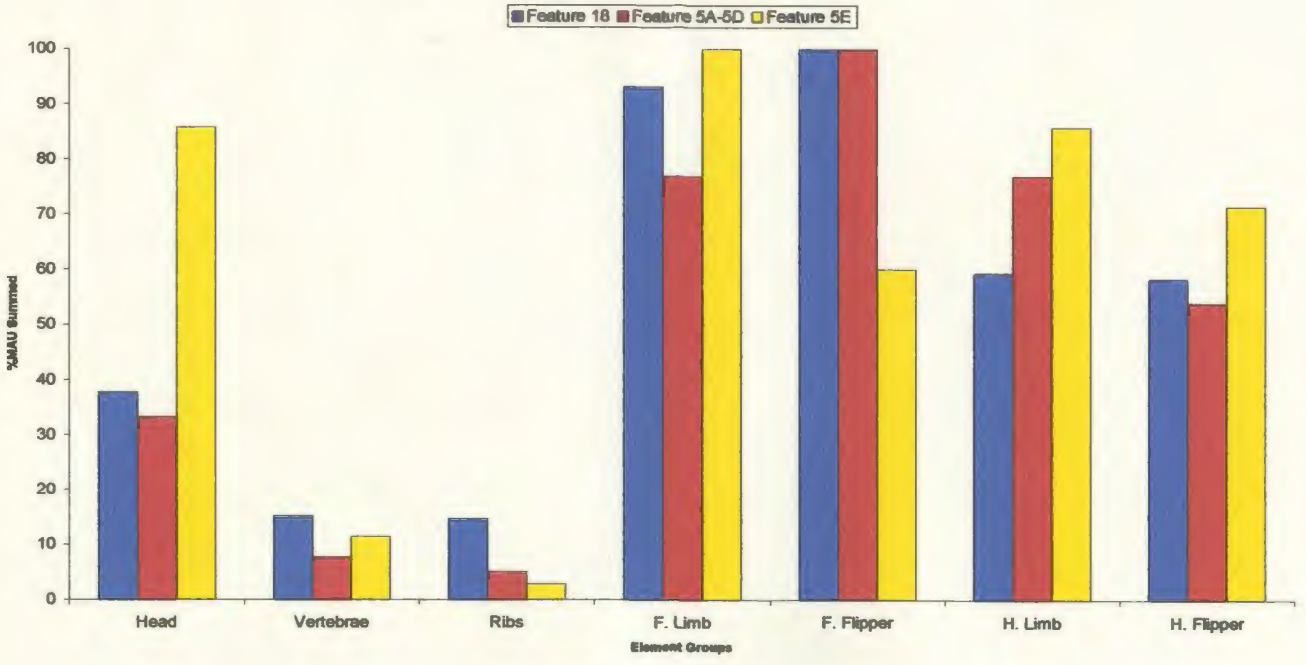


Figure 5.18 Phillip's Garden West %MAU (Summed)



The most significant difference is the very low relative frequency of heads in Features 18 and 5A-5D compared to Feature 5E. Cranial specimens were mostly identified portions or whole auditory bullae, an extremely dense and easily identified element. The apparent over-abundance in one sample can not be explained as being due to differential preservation, since the features are very close to one another and soil and bedrock conditions are identical. In addition, there are strong similarities in the representation of other elements, most of which are much less dense than the auditory bulla. Unfortunately Chambers (1992; cited in Lyman 1994) did not record density values for auditory bulla; the only cranial bone for which he recorded bone mineral density was the mandible. This element is relatively dense and infrequent in all three samples from Phillip's Garden West. Nevertheless, the relative frequency of heads at Feature 5E is remarkable when compared to Features 18 and 5A-5D. Because of its high density, it is difficult to explain the low frequency of crania in Features 18 and 5A-5D. This situation highlights the importance of examining multiple lines of evidence to explain patterns of skeletal frequency.

Murray (2000:58) points out that contemporary zooarchaeology is focused on the formation and transformation of the archaeological record as well as technical and quantitative methods, while little attention has been devoted to cultural variation and ideology in the formation of faunal assemblages. She states, "Bones represent more than practical economic decisions about transport and consumption. They also reflect the social and symbolic behaviours of people" (Murray 2000:59). She reviews ethnographic

reports that describe the customs of processing pinnipeds from hunting to disposal among a number of northern hunter groups in order to demonstrate ritual aspects of carcass treatment. Of particular interest in this study is the treatment of seal skulls.

Rasmussen (1931), notes that when the Netsilik residents moved, seal heads were laid on clean snow or sea ice pointed in the direction of a new camp so that the souls of the seals could follow the people and ensure good hunting (Also see Søby 1970). Murdoch (1892) states that the Inupiat avoided fracturing or throwing seal skulls into the sea, keeping them in piles in front of their houses. This was done to keep the souls of the seals content. Murray describes Lantis' (1947) ethnographic work among the Alaskan hunters of Nunivak Island. Here the hunters kept seal skulls on shelves facing the door in their dwellings. In the spring the skulls and bones were buried in special disposal sites.

Fienup-Riordan (1994:105) describes the care taken with seals' heads by the people of Nelson Island and the Yukon Delta. To insure the return of seals in the future, the women of Nelson Island place the head of seals inside the house facing the door. The people of the Yukon Delta place seal heads facing toward the interior of dwellings to encourage other seals to follow them into the human world.

Archaeological evidence for the apparent over-abundance of seal skulls comes from a number of sites. Savelle (1984) notes a relatively large number of seal skulls on a historic Inuit site on Somerset Island in the Canadian Arctic. Murray (1992) finds cranial elements were the most frequent phocid bones in her sample from Phillip's Garden, a large Middle Dorset site occupied between 2140 and 1250 years B.P. (see also Renouf and

Murray 1999). A similar relative frequency of skulls was found elsewhere on this Middle Dorset site by Linehan (1990). Stewart (1979) notes the high representation of seal skulls in the faunal assemblage from Factory Cove on the Great Northern Peninsula. Hodgetts (1999) describes an over-abundance of seal skulls on Younger Stone Age sites in northern Norway, and Lyman (1991b) notes a similar situation for sea lion skulls from the Pacific Northwest.

Murray (2000) points out that the assumption that meat utility considerations account for variability in faunal assemblages ignores cultural considerations, not only spiritual treatment, but the fact that particular body portions may be considered delicacies. Relying too heavily on these indices can lead to interpreting an overabundance of heads as butchering waste, or storage of low meat value parts for later consumption.

The relative lack of seal skulls in all but one of the features from Phillip's Garden West may be the result of differential treatment of the heads. It is possible that the skulls were removed and transported elsewhere for some ritual purpose during the earlier occupation at the site. It is important to remember Davis' (1987) concern that absence of evidence is not necessarily evidence of absence. Nevertheless, the auditory bullae is probably the most dense and indestructible element in the seal skeleton and its absence is unlikely to be the result of preservation conditions. It is more likely that skulls were never brought to the site during the earlier period of occupation or were transported from the site.

The reverse utility figures generated when the relationship between meat utility and

element frequency was compared for the samples from Phillip's Garden West suggest the possibility that the site functioned as kill/butchery location from which seal portions of high meat value were removed. While there was a weaker negative correlation between meat utility and element frequency, when elements were grouped to include riders, all results showed strongly significant negative correlations. There is some basis to support the suggestion that differential transport was operating here. The consistent absence of the rib, innominate and vertebral elements in these samples suggests the possibility that these high meat value elements were transported from the site.

There is some ethnographic and archaeological evidence for the transport of seal meat. Park (1998) suggests that the drying and transport of seal meat may explain the frequency of seal bones on a Thule site on Devon Island. He points out that the teeth of seals found in Thule winter houses demonstrate that they died during the spring. Park suggests that during the dark days of winter the Thule may have relied on stored seal for consumption. Park goes on to point out that seal caught during the spring were likely to have required some processing to keep them from rotting. He suggests that this may have been accomplished by drying the meat. While this is compelling evidence, it is based on the seal skulls which could have been afforded special treatment. It is possible that the skulls alone were carried from Thule spring habitations for reasons other than subsistence.

Park points out that while there is a fair amount of evidence for caribou processing in the ethnographic record there is little on the processing of seal for storage and transport. Nevertheless he goes on to cite a number of early ethnographies to show that

drying seal meat was practiced in the past. Otto Fabricius (1962:108-109) states that among the Inuit of Greenland, seal is processed for storage: "for drying purposes it is cut into flat slices as far as this can be done on account of the bones, which are allowed to remain; the slices are then laid upon bare rocks with sun and wind in summer; a small amount of blubber is also left on to make it tasty." In other ethnographic accounts Park finds similarities in the way seal is dried. It is usually cut into pieces and allowed to dry only to the point where a crust forms over the meat. In my own brief conversations with Inuit hunter Olayuk Akesuk of Cape Dorset, Baffin Island, I learned that seal meat is often lightly dried for storage, and that bones are sometimes included in the dried pieces.

The ecology of the harp seals that migrate along the coast of the Point Riche and Port au Choix peninsulas suggests a likelihood that some degree of processing for transport away from the site could have been conducted. Ethnographies that detail the hunting of seals concentrate on species that appear over extended periods of the year as individuals, not in large herds. The seal species mentioned are often ringed seal which are also significantly smaller than harp seal. The harp seal populations that passed the coast of Port au Choix arrived in huge numbers for the period from early spring to early summer. This would have allowed the Groswater hunters opportunities to capture numbers of these animals over that relatively short period. Since exploitation opportunities were frequent yet temporally restricted, some sort of processing for transport away from the site would have likely been performed. Groups who enjoy the sudden appearance of animals such as migrating salmon and caribou usually maximize their exploitation of these animals by

processing some quantity for later consumption. While transport of meat from the site at Phillip's Garden West may not completely account for the overall configuration of phocid bones on the site, there is evidence to suggest that some amount of transport could have been accomplished.

The body shape of seals and the location of the kill suggests that it is more likely that the seal carcass was transported to the site whole. Lyman et al. (1992) point to a number of morphological features of seals that are distinct from terrestrial mammals and can result in their unique treatment. They point out that pinnipeds have spindle-shaped, streamlined bodies with only short appendicular protrusions. This suggests that initial butchering to facilitate easy transport at the kill site and removal of portions may not have the same practical considerations as with terrestrial mammals. Binford (1978), describing the primary butchery of a caribou, notes that the head and antlers were removed so that the animal could be laid on its back for further butchery. This would not be a practical consideration for the butchering of seal as it could be handled easily from any side without the removal of either cranium or limbs. The transport of heavy, low value parts of terrestrial mammals, particularly ungulates, would have to be considered during primary butchery as these parts tend to be rather large and cumbersome. It is unlikely that portions of the seal carcass would be invariably abandoned at the kill location since the consistent quality of the fur covering the animal, and similarly consistent blubber layer would make no part of this animal particularly extraneous. In addition, seals are fairly easy to drag whole. Indeed most of the ethnographic literature as well as in the majority

of instances observed by Whitridge, seals are returned whole to residential sites (Lyman et al.1992:544).

Despite the possibility that transport of some portion of the seal carcass may have occurred at this site, interpreting Phillip's Garden West as a kill/butchery site rather than a residential site based on the results of comparisons between skeletal element frequency and utility is simplistic and relies on the assumption that sites must be designated either kill/butchery or residential. The location of Phillip's Garden West, near the shore where seals could have been hunted or landed if caught off shore, would be a natural location for the primary butchery of seal for some immediate, limited consumption and processing for transport of high meat value portions. It is possible that Phillip's Garden West had many functions, including the butchering and processing of seals, but that it was also a place for the monitoring of game as well as a residential camp where a variety of domestic and hunting activities took place.

The features and the range of artifacts present at Phillip's Garden West reflect a residential site where numerous activities took place. There was one dwelling feature defined by a circle of five post holes. Five hearths were identified, four outside the dwelling, and one situated in the center of the house feature. Artifacts recovered from this site include hunting implements such as endblades, but also hide-working tools including scrapers and burin-like-tools. There were many varieties of bifaces and sideblades, as well as utilized flakes. The site and midden were strewn with stone flakes and there were a number of preforms and cores.

Phillip's Garden West overlooks the sea on three sides, and also looks back across the Point Riche Peninsula. It affords an excellent view of sea mammal movement off shore and is close to a beach where these animals would have hauled out, or been landed by hunters. From this location hunters would have gone out in boats to hunt seals in the spring. Many seals would have been taken in open water, or along the ice edge, and would have to have been returned to shore for butchering. Unlike terrestrial species and sea mammals taken on land fast ice, animals taken in the water would not have been butchered at the kill location.

While transport of skeletal parts may have played a significant role in the configuration of bones in these samples, the relative frequency of elements may be the result of differential bone mineral densities. The bone mineral density of the ribs and vertebrae in all the samples goes some way toward explaining their relatively low numbers on the site. The vertebrae ranked lowest in density followed by the ribs. While it is possible that the ribs and vertebrae were transported from the site, it is also likely that the low density of the bones contributed to their under-representation. While Lyman et al. (1992) do not consider transport of some portion away from the residential site, they suggest that variability in frequencies of phocid bones are likely to be a result of taphonomic processes that take place at the residential site, including feeding dogs and natural post-depositional processes. There is no evidence that the Groswater Palaeoeskimo had dogs, and there were no signs of large carnivore gnawing on the bones from this site. Since it is likely that the harp seals were returned whole to Phillip's Garden

West and dogs were not likely to have contributed to the under representation of faunal remains, density mediated post-depositional destruction is a likely contributor to the variability in the faunal assemblage noted for Phillip's Garden West.

Taken alone, the correlation observed between the meat utility indices devised by Lyman et al. (1992) and the MAUs from the samples at Phillip's Garden West suggest that this site functioned as a butchering station from which packages of high meat value were removed to be consumed elsewhere. However, the features on the site, the range of artifacts present, the location of the site, and the evidence of structural density of seal bones all challenge this interpretation. Taken together, the separate lines of evidence point to Phillip's Garden West being a residential site from which hunting, game monitoring and domestic activities were initiated. Seals were most likely hunted in boats from the water or along the ice edge or on land nearby. It is most likely that the whole carcass was returned to the site for processing and consumption. It is possible that some portion of this meat was transported elsewhere, suggested by the low frequency of the high meat value parts of the skeleton. While this may explain the low frequency of the relatively dense innominate in all samples, it is impossible to discount the destruction of elements due to natural post-depositional forces, especially for the less dense, but meaty elements including the vertebrae and ribs. Both interpretations have validity, and are probably both operating to a greater or lesser extent.

In comparing the samples from over the entire occupation of the site there is very little difference in the treatment of the seal carcass. However, it is significant to note that

during the early occupation of Phillip's Garden West (Feature 18 and Feature 5A-5D), seal skulls are poorly represented, while later (Feature 5E) they become the most frequent element. It has been noted that Palaeoeskimo sites often have an over-abundance of these elements, and that this is at least partially the result of some special, ritual importance cranial elements had for the inhabitants. It is possible that there was a shift in the treatment of skulls on the site toward the end of the occupation here, and by extension a shift in some aspect of the function at this site. A comparison of the frequency of phocid bones from the adjacent site of Phillip's Garden East should offer insights into the differential treatment of phocids contemporary with the earlier period of occupation at Phillip's Garden West.

5.8 Phillip's Garden East: Body Part Frequency

Table 5.16 provides the MNE, MAU, and %MAU values for the faunal assemblage from the younger occupation at Phillip's Garden East. Figure 5.19 illustrates the frequency of the body parts as MAU. It shows that the cranium is highly represented, followed by hind phalanges, metatarsals, and mandibles. These are followed by front limb and flipper elements. There are relatively low numbers of other axial elements such as vertebrae and ribs, and also hind limb bones, in particular innominate, femur, tibia and fibula. When the elements are grouped (Figure 5.20), these summed MAU values show that heads and hind flippers are highly represented, followed by front flippers. Proximal limb bones, vertebrae and ribs are poorly represented.

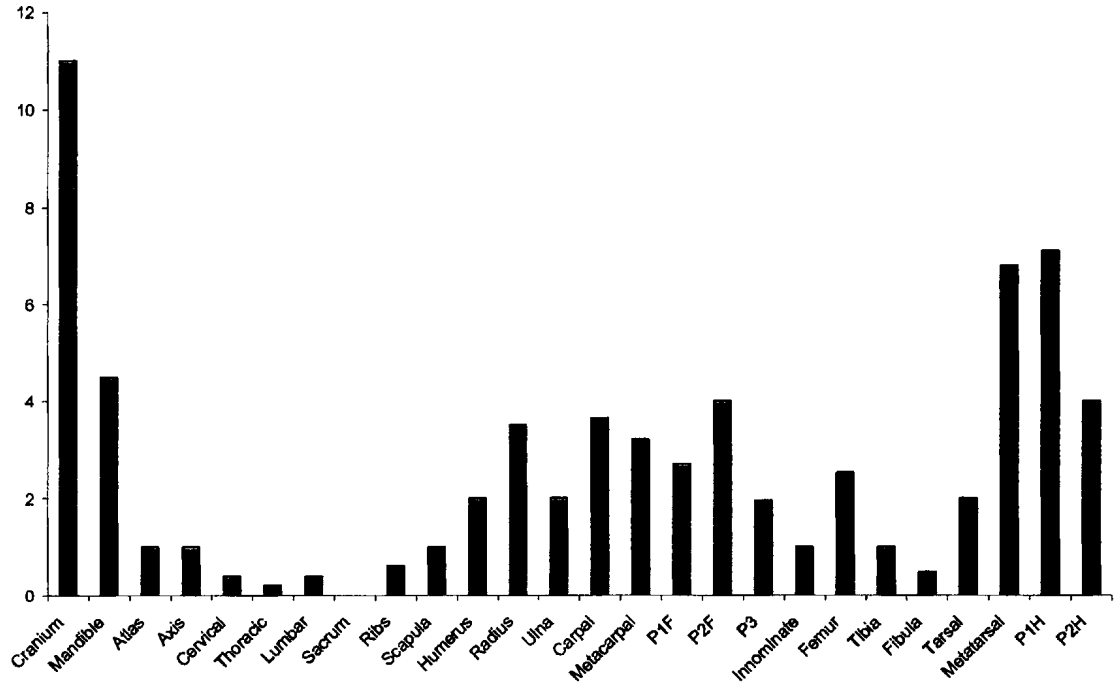
Table 5.16 Phillip's Garden East Body Part Frequency

Element	# in skeleton	MNE	MAU	%MAU
Cervical	5	2	0.4	3.6
Cranium	1	11	11	100
Mandible	2	9	4.5	40.9
Atlas	1	1	1	9.1
Axis	1	1	1	9.1
Thoracic	15	3	0.2	1.8
Lumbar	5	2	0.4	3.6
Sacrum	1	0	0	0
Ribs	30	18	0.6	5.5
Scapula	2	2	1	9.1
Humerus	2	4	2	18.2
Radius	2	7	3.5	31.8
Ulna	2	4	2	18.2
Carpal	14	51	3.6	33.1
Metacarpal	10	32	3.2	29.1
Phalanges 1 front	10	27	2.7	24.6
Phalanges 2 front	8	32	4	36.4
Phalanges 3 all	20	39	2	17.7
Innominate	2	2	1	9.1
Femur	2	5	2.5	22.7
Tibia	2	2	1	9.1
Fibula	2	1	0.5	4.6
Tarsal	14	28	2	18.2
Metatarsal	10	68	6.8	61.8
Phalange 1 hind	10	71	7.1	64.6
Phalange 2 hind	8	32	4	36.4
Total	**181**	**454**	**68**	

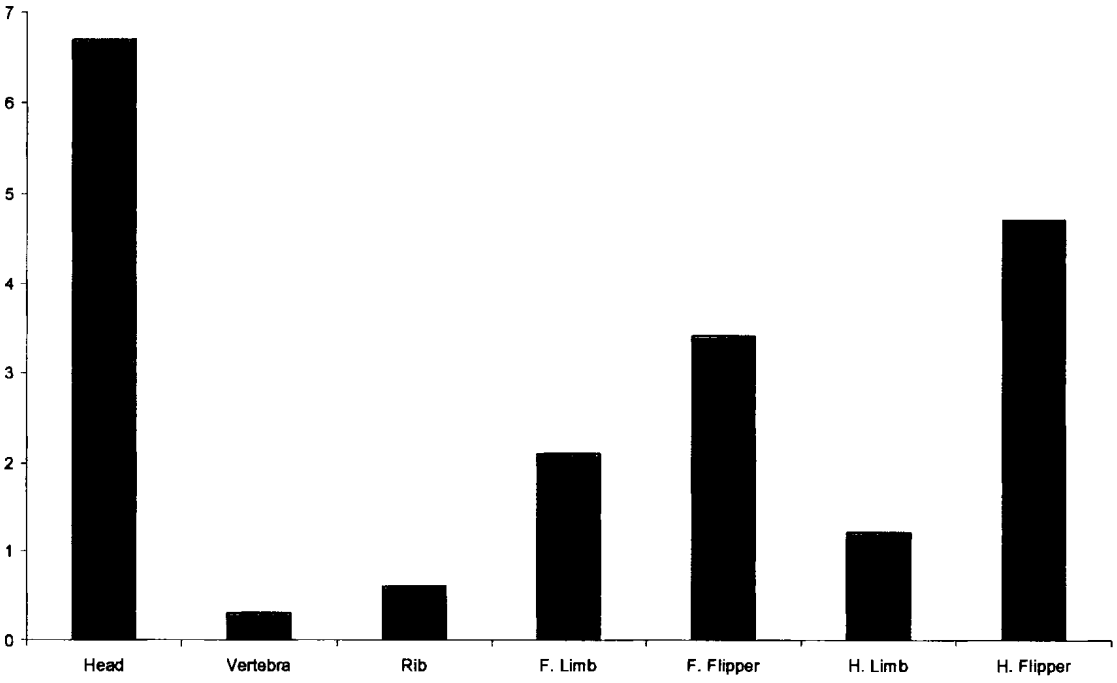
Table 5.17 Phillip's Garden East MAU (Summed)

Element Group	MAU	%MAU
Head (Cranium and Mandible)	6.7	100
Vertebrae (Atlas, Axis, Cervical,	0.3	4.5
Ribs	0.6	9
Front Limb (Scapula, Humerus, Radius,	2.1	31.3
Front Flipper (Carpal, Metacarpal, Front	3.4	50.8
Hind Limb (Innominate, Femur, Tibia,	1.2	17.9
Hind Flipper (Tarsals, Metatarsal, Hind	4.7	70.2

Figure 5.19 Phillip's Garden East Phocid MAU



Figur 5.20 Phillip's Garden East MAU (Summed)



5.9 Meat Utility of Phocid Body Parts: Phillip's Garden East

Table 5.18 lists the MAU values for Phillip's Garden East against the %MUI and %MMUI values derived by Lyman et al. (1992). Figure 5.21 shows a weak negative correlation that is not considered significant between the MAU values from Phillip's Garden East and the %MUI (r_s= -0.2, p< 0.5). However, Figure 5.22 shows that a much stronger, negative correlation is achieved when the modified utility index is used (r_s= -0.71, p=< 0.005). This indicates that parts of high meat value are not as well represented as portions of low meat value.

Table 5.18 Phocids MAU Values from Phillip's Garden East Against %MUI and %MMUI

Skeletal Part	%MUI	MAU Frequency PGE	Parts Averaged	%MMUI
Head (He)	27.4	6.7	Head & Cervical (He/Ce)	31.6
Cervical (Ce)	35.8	0.6	None (Ce)	35.8
Thoracic(Th)	24.9	0.2	Thoracic & Rib (Th/Rb)	62.4
Lumbar (Lu)	32.9	0.4	Lumbar & Pelvis (Lu/PV)	38.7
Pelvis (PV)	44.5	1	None (PV)	44.5
Rib (Rb)	100	0.6	None (Rb)	100
Sternum (St)	2.7	0	Rib & Sternum (Rb/St)	51.4
Scapula (Sc)	19.8	1	Rib & Scapula (Rb/Sc)	59.9
Humerus (He)	10.7	2	Scapula & Humerus (Sc/He)	15.2
Radius/Ulna (R/U)	4.8	2.8	Humerus & Radius/Ulna (He/R/U)	7.7
Front Flipper (FF)	2.3	3.4	Radius/Ulna & Front Flipper (R/U/FF)	3.6
Femur (Fe)	4.5	2.5	Pelvis & Tibia/Fibula (PV/T/F)	30.5
Tibia/Fibula (T/F)	16.5	0.8	None (T/F)	16.5
Rear Flipper (RF)	7.7	4.7	Tibia/Fibula & Rear Flipper (T/F/RF)	12.1

Figure 5.21 Scatterplot of MAU Frequencies of Phocids From Phillip's Garden East Against %MUI

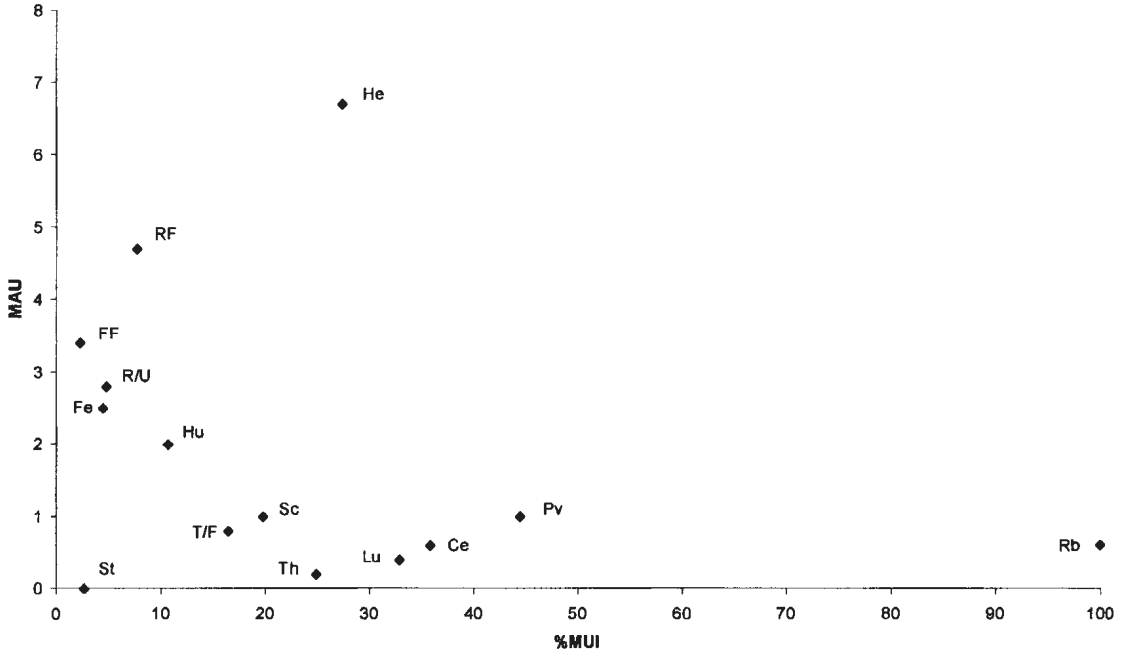
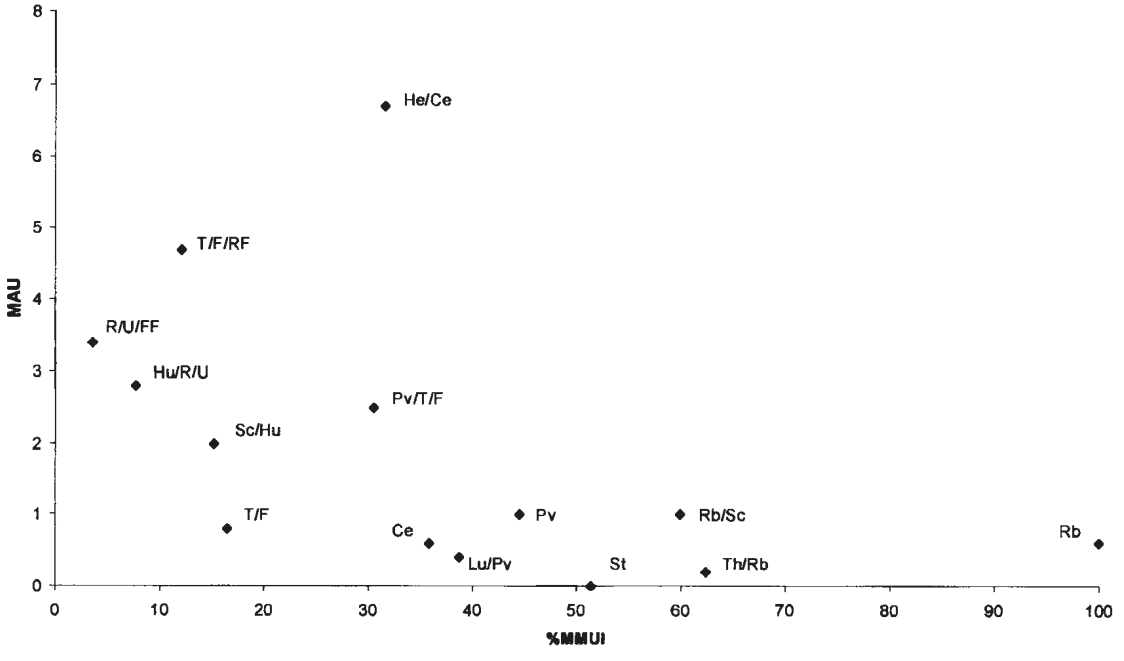


Figure 5.22 Scatterplot of MAU Frequencies of Phocids from Phillip's Garden East Against %MMUI



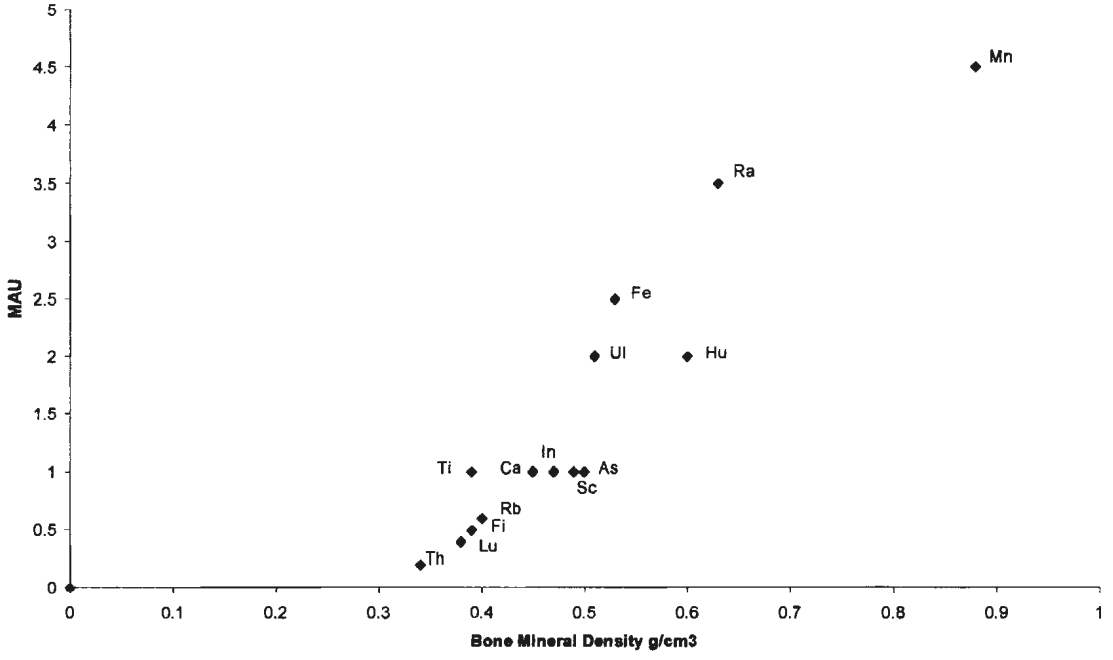
5.10 Bone Mineral Density of Phocid Body Parts: Phillip's Garden East

Table 5.19 shows the bone mineral density values for the scan sites and the MAU values in the Phillip's Garden East sample. Figure 5.23 illustrates the relationship between these variables. There is a strong and highly significant positive correlation (r_s= .96, p<.0001). This indicates that bones of relatively low mineral density are not as well represented on the site compared to elements of high mineral density.

Table 5.19 Bone Mineral Density Values (from Lyman 1994:248) and MAU Values for Phillip's Garden East

Element	Scan Site	Bone Mineral Density	MAU
Mandible (Mn)	Average (DN7, DN5)	0.88	4.5
Thoracic Vertebra (Th)	TH1	0.34	0.2
Lumbar Vertebra (Lu)	LU1	0.38	0.4
Sacrum (Sa)	NA	0	0
Rib (Rb)	RI1	0.4	0.6
Scapula (Sc)	SP1	0.49	1
Humerus (He)	HU5	0.6	2
Radius (Ra)	RA1	0.63	3.5
Ulna (Ul)	Average (UL2, UL3)	0.51	2
Innominate (In)	AC1	0.47	1
Femur (Fe)	FE2	0.53	2.5
Tibia (Ti)	TI1	0.39	1
Fibula (Fi)	FI1	0.39	0.5
Astragalus (As)	Average (AS1, AS2)	0.5	1
Calcaneum (Ca)	Average (CA1, CA2)	0.45	1

Figure 5.23 Scatterplot of MAU Frequencies of Phocids for Phillip's Garden East Against Bone Mineral Denisty Values for Seals

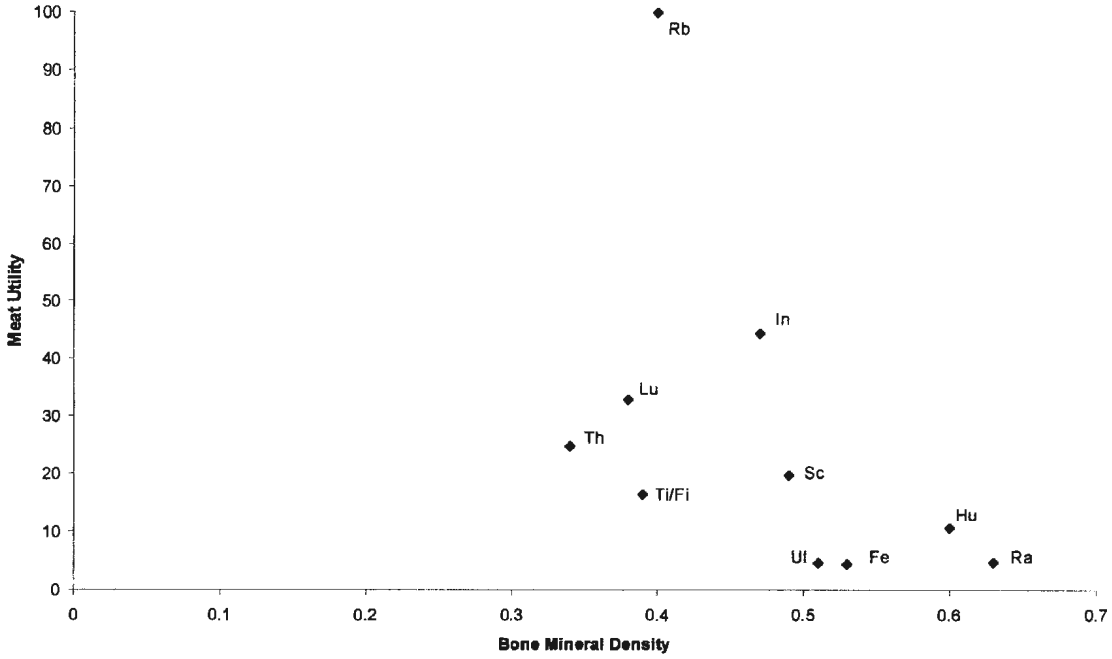


5.11 Interpretation of Phocid Body Part Frequency at Phillip's Garden East

The results of comparing MAU values to the meat utility indices as well as the bone mineral density values show two equally valid interpretations for the configuration of faunal remains at Phillip's Garden East. Comparing the MAU values to the modified meat utility index indicates a reverse utility strategy suggesting that Phillip's Garden East functioned more as a kill/butchering site rather than a residential location. Alternatively, ranking phocid MAU against bone mineral density values shows a strong positive correlation suggesting that the phocid bone frequency is the result of differential survival of elements based on their density (Figure 5.23). As in the case of Phillip's Garden West, a number of factors are probably influencing the variability in the faunal assemblage at Phillip's Garden East, and meat utility and density mediated destruction must be viewed in light of a number of possible factors. Alternative approaches include ideological treatment of some body parts, and the nature of the occupation at the site.

Figure 5.24 shows that when the meat values are ranked against the bone mineral density values for the phocid bones for this site there is a significant negative correlation (r_s= -.64, p< .05). This demonstrates that meat utility and bone density have a significant relationship where the least dense bones tend to have the greatest meat value.

Figure 5.24 Scatterplot of Meat Utility Values Against Density Values From Phillip's Garden East



The low proportion of high meat value body parts may well be the result of differential preservation. As mentioned above, the ribs are long and relatively thin, while the vertebrae are porous, and with numerous small protrusions making both elements prone to destruction from natural forces as well as trampling and other human activities. Conversely, crania may be over-represented here because the auditory bulla is extremely dense and likely to survive natural or human destruction. While this may be the case, it is possible, based on the ethnographic data presented in discussions of Phillip's Garden West, that the skulls were afforded special treatment. Indeed, skulls may have been transported to the site, or curated over long periods of time.

Phillip's Garden East yielded a wide range of artifact material reflecting an assortment of hunting and domestic activities. The features on the site include hearths and a dwelling. This evidence strengthens the suggestion that this site was a residential location at which a variety of activities took place. LeBlanc (1996:80) suggests that the site was a short term residential camp established for the exploitation of harp seals. Its location on what would have been a low beach terrace offered a good view of, and quick access to the sea for the exploitation of seal populations. As these animals were hunted from the open water, or offshore ice edge, as well as land, they were likely to have been returned to the site for butchery. The landscape of this region in early spring was still very cold and snow-covered, allowing easy transport of whole seal carcasses.

As mentioned above, the harp seal entered this area in large numbers for a relatively short time during the year. It is possible that the Groswater, like many groups

exploiting abundant but temporally restricted species, processed some of the carcass for transport elsewhere.

In summary, I believe that any number of factors influenced the variability in the faunal assemblage at this site. Some of the elements that are high in meat value may have been removed from the site for consumption elsewhere, but these rather slim and porous elements were also most likely to have been destroyed by various taphonomic agents, so any cultural interpretation must be offered tentatively. Artifactual and feature data from the site suggest multiple functions for this site, indicating that domestic as well as hunting activities took place here. Despite the fact that the auditory bullae are dense, their high frequency at this site is possibly due to their special treatment by the inhabitants. The differential frequency of crania is striking when compared to Phillip's Garden West.

5.12 Inter-site Variability in Body Part Frequency: Phillip's Garden West and Phillip's Garden East

Figure 5.25 and Figure 5.26 show the %MAU and %MAU summed values for the three Phillip's Garden West features with the Phillip's Garden East sample. These samples have some striking similarities and differences.

To understand the similarities and differences between the samples from Phillip's Garden West and Phillip's Garden East I ranked MAU values for the sites against one another and performed Sprearman's rho calculations. Table 5.20 shows the correlation and significance of the relationship. In each case the MAU values from Phillip's Garden

East are significantly correlated with those from Phillip's Garden West. There is a stronger positive correlation between Phillip's Garden East and Feature 5E than with the other features at Phillip's Garden West. This may be related to the fact that Phillip's Garden East and Feature 5E at Phillip's Garden West are both dominated by cranial elements.

Table 5.20 Spearman's rho Calculations of MAU Values for Phocids in Samples from Phillip's Garden West & Phillip's Garden East

	Feature 18	Feature 5A-5D	Feature 5E
Phillip's Garden East	r_s=.45, p=.02	r_s=.45, p=.02	r_s=.61, p=.001

Feature 18 and Feature 5A-5D are contemporary with the Phillip's Garden East site (Table 5.21), yet these samples show the greatest differences (Figure 5.27 and Figure 5.28). Phillip's Garden West and Phillip's Garden East are within a kilometre of each other, and have very similar soil conditions. In addition, all the faunal remains were excavated from middens. It is expected that natural post-depositional forces would be essentially the same for faunal material on both sites. As the sites are occupied by people of the same culture, one would expect similar treatment of seal carcasses on two contemporary residential sites. Thus holding soil conditions, culture and chronology constant, variability in the frequency of body parts at the two residential sites suggests some degree of functional difference in the processing of seal between the sites.

Table 5.21 Uncalibrated Radiocarbon dates from Features from Phillip's Garden West and Phillip's Garden East.

Site & Feature	Date	Beta Number
Phillip's Garden West, Feature 18	2460 ± 120 B.P.	Beta 49761
Phillip's Garden West, Feature 18	2340 ± 100 B.P.	Beta 49760
Phillip's Garden West, Feature 5A-5D	2240 ± 70 B.P.	Beta
Phillip's Garden West, Feature 5E	1960 ± 80 B.P.	Beta 66438
Phillip's Garden East Feature 53	2260 ± 70 B.P.	Beta 50022
Phillip's Garden East Feature 55	2500 ± 60 B.P.	Beta

Figure 5.25 Phillip's Garden West and Phillip's Garden East Phocid %MAU

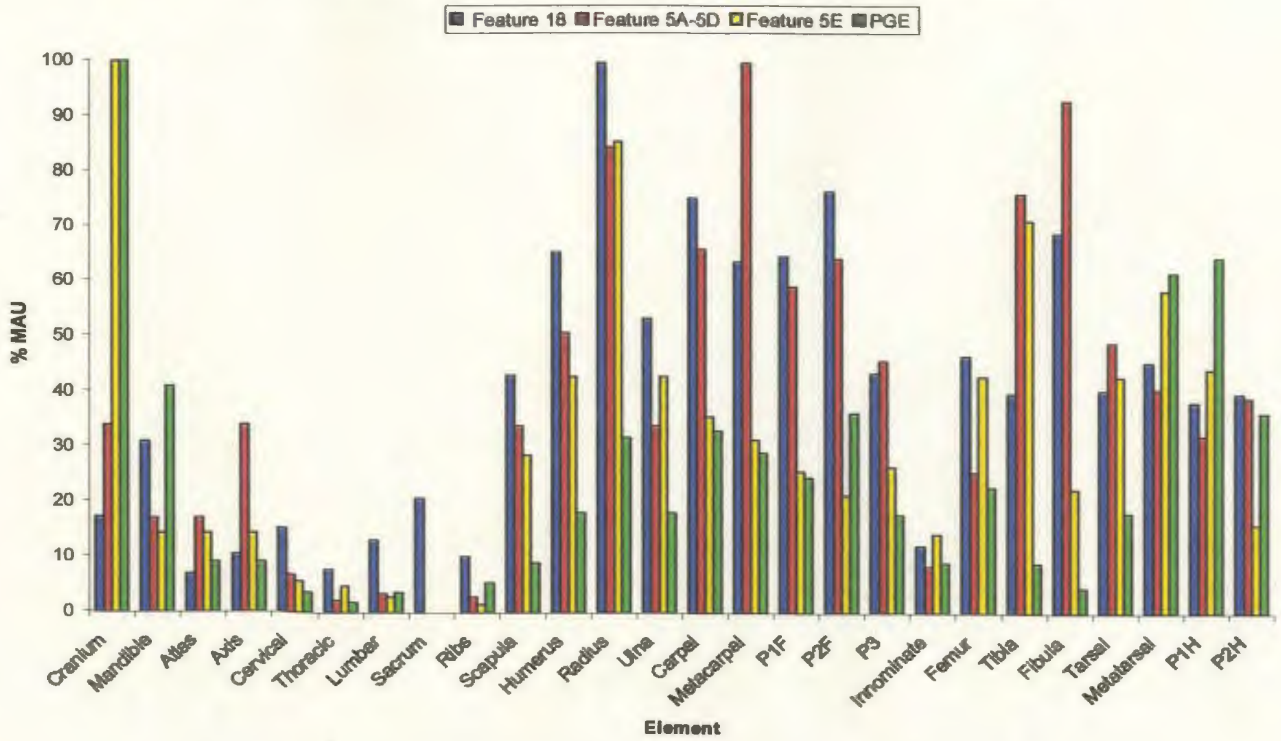


Figure 5.26 Phillip's Garden West and Phillip's Garden East Phocid %MAU (Summed)

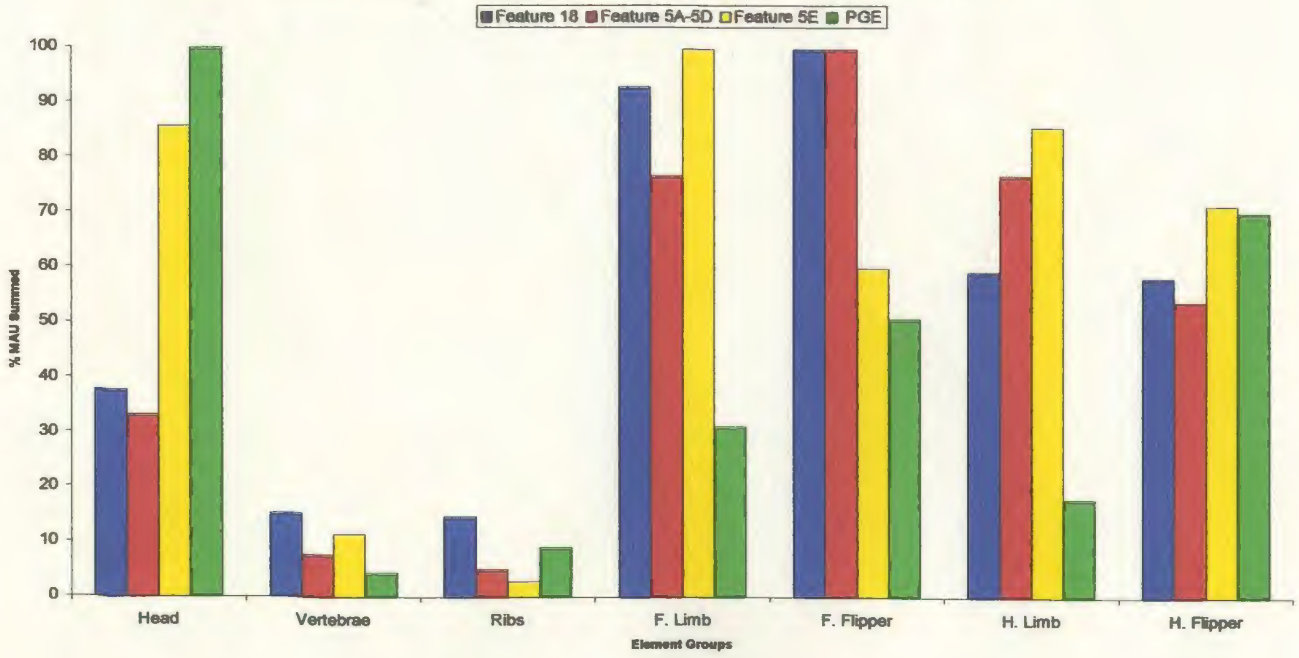
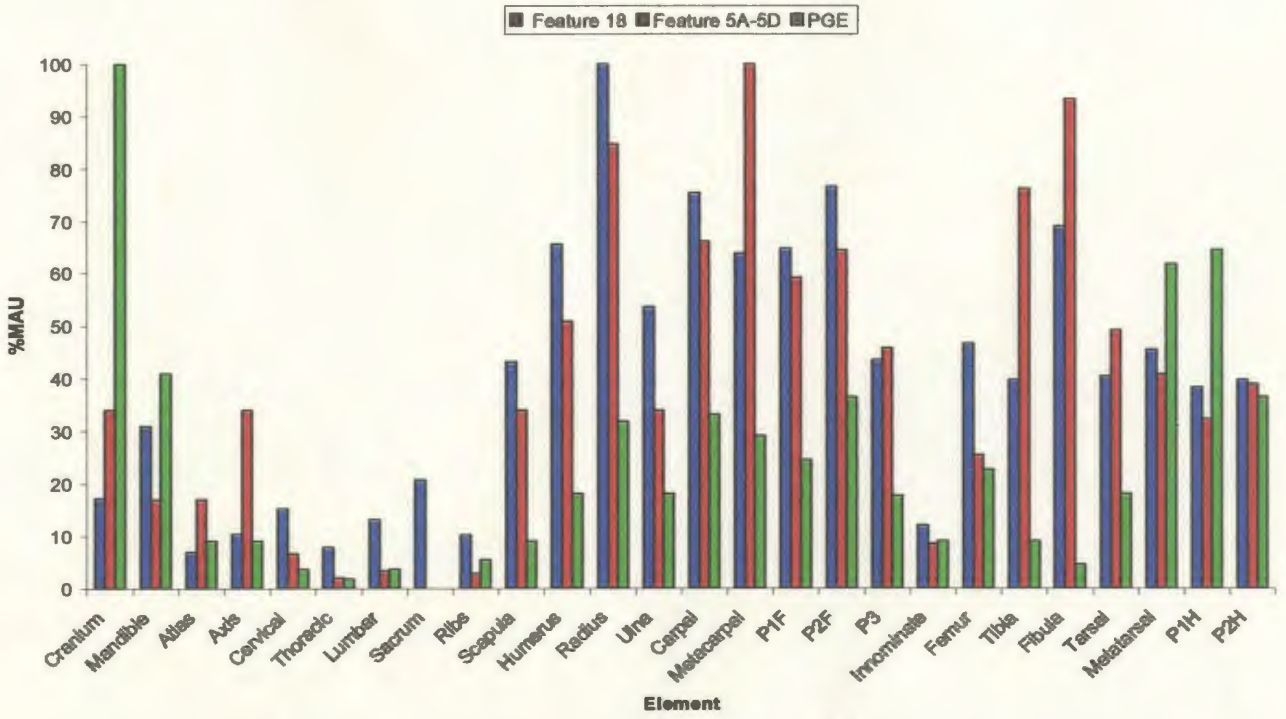
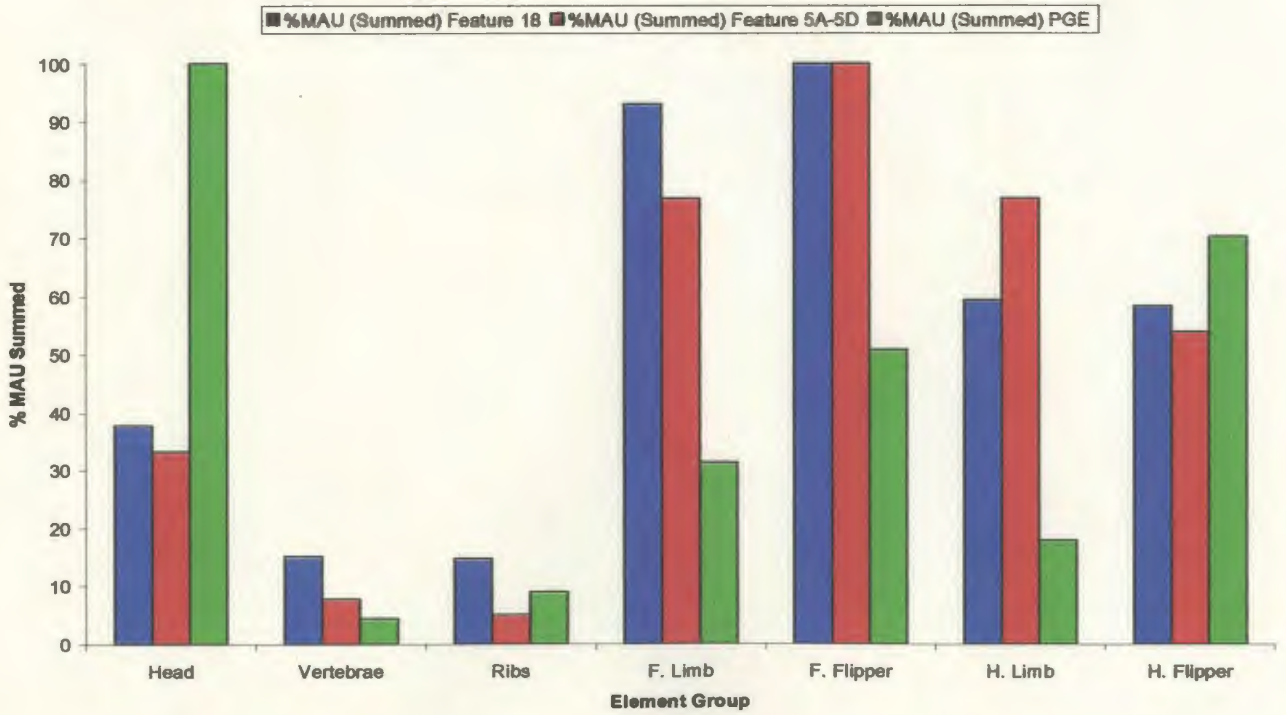


Figure 5.27 %MAU Features 18 and 5A-5D at Phillip's Garden West Compared to Phillip's Garden East



Figue 5.28 Summed %MAU for Contemporary Features 18 and 5A-5D, Phillip's Garden West and Phillip's Garden East



The samples from both sites show a low relative frequency of vertebrae and ribs. As mentioned above, attempting to distinguish whether this is a result of post-depositional destruction or transport off site, or a combination of both is difficult. I am inclined to believe that natural destruction is the most likely factor, on the basis of the low frequency of these elements in other cultural and depositional contexts; however this is somewhat speculative (Hodgetts 1999; Murray 1992). Hind flippers are also relatively equally represented at the sites, with slightly greater representation during the later occupation at Phillip's Garden West (Feature 5E) and at Phillip's Garden East.

The front and hind limbs as well as the front flippers are poorly represented in the Phillip's Garden East sample compared to the Phillip's Garden West features. In the proximal limb bones there are striking differences between the Phillip's Garden East sample and Feature 5E (Figure 5.29 and Figure 5.30). In Feature 5E there are numerous front and hind limbs compared to Phillip's Garden East. The crania show conspicuous differences among the samples. They are extremely well represented in the samples from Phillip's Garden East and Feature 5E, and poorly represented in the other samples from Phillip's Garden West.

Figure 5.29 %MAU Feature 5E, Phillip's Garden West and Phillip's Garden East

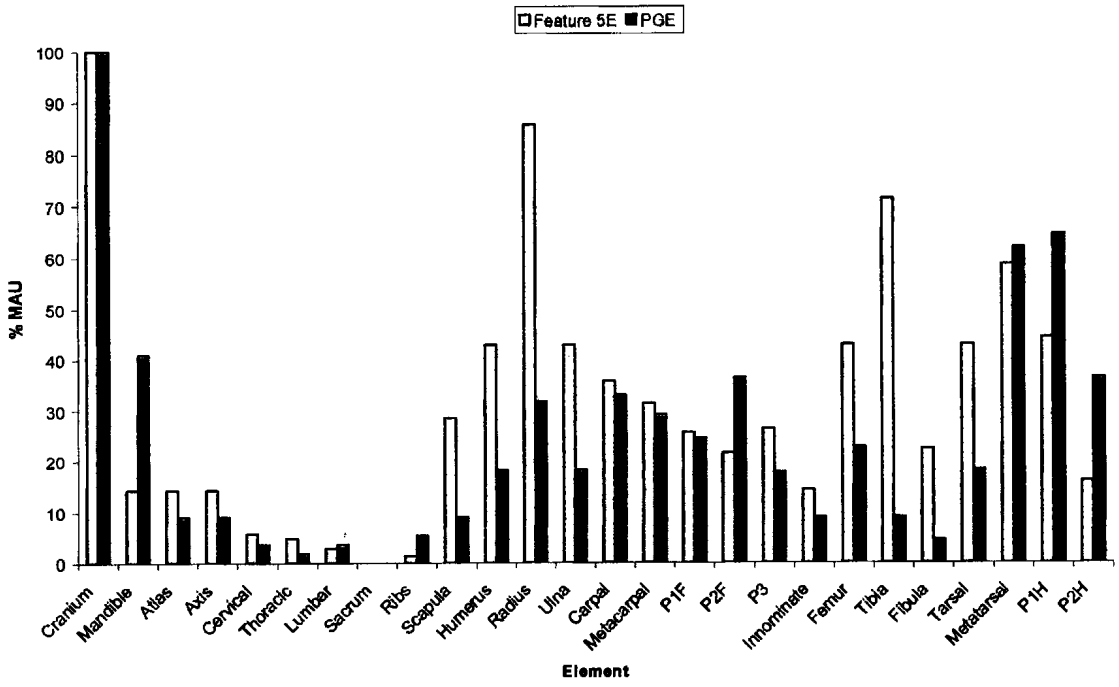
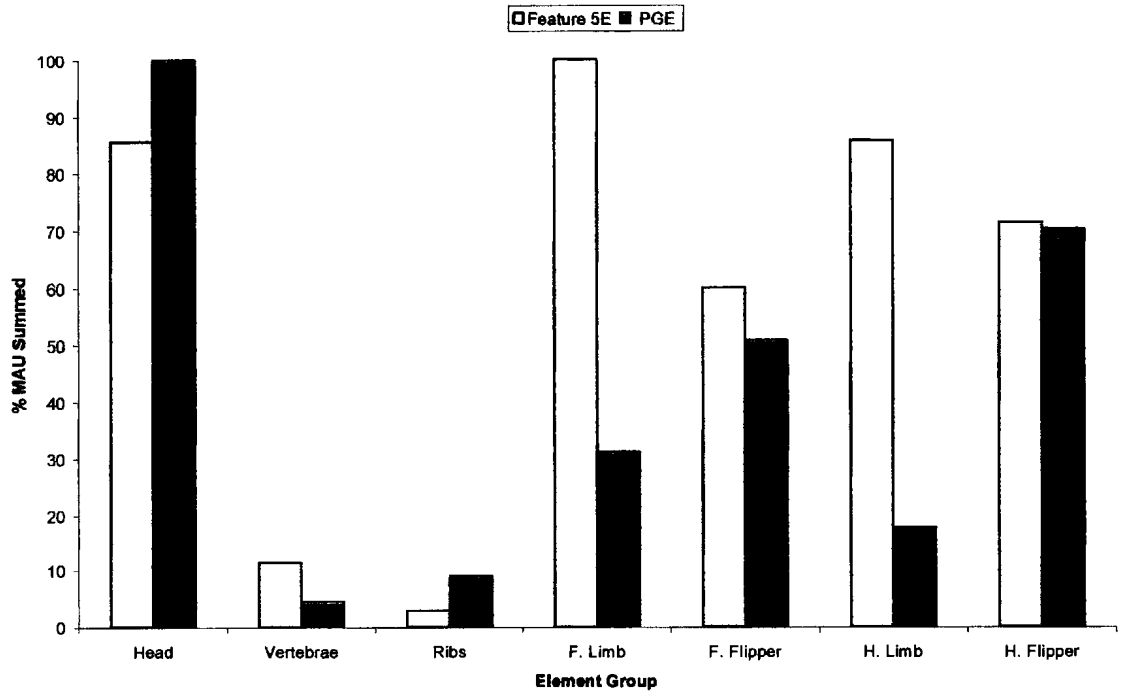


Figure 5.30 Summed %MAU for Feature 5E, Phillip's Garden West and Phillip's Garden East



An interesting pattern emerges when comparing the samples from Phillip's Garden East and Features 18 and 5A-5D at Phillip's Garden West. The dates from these sites overlap and the species exploited and season of occupation are similar, suggesting that these two sites were occupied at the same time and season. In some instances the faunal assemblage variability between the two sites resembles a mirror image of each other (Figure 5.27 and Figure 5.28). For instance, there are many crania at Phillip's Garden East and few in the contemporary samples from Phillip's Garden West. While there are few front limbs, front flippers and hind limbs in the Phillip's Garden East sample, there are greater amounts in the contemporary samples from Phillip's Garden West. Again vertebrae and ribs are similar for both, but as mentioned this may be the result of natural taphonomic processes. An explanation of this pattern requires exploration.

It is possible that these two sites were directly connected to one another. For example, they could have been involved in the processing of seal carcasses in some cooperative fashion which resulted in the differential disposal of body parts. It is only the disposal that we can see at this stage, making it difficult to demonstrate how processing was administered between the sites. A number of scenarios are explored.

It is possible that Phillip's Garden East functioned as a hunting camp where seals were initially butchered and parts of low meat value were deposited (skulls and hind flippers) while other parts were transported to Phillip's Garden West. This suggests that consumption may have taken place at Phillip's Garden West and only butchery at Phillip's Garden East. The presence of hearths, dwelling features and the wide range of artifact

types at Phillip's Garden East suggesting a residential site is difficult to explain in light of this interpretation. Nevertheless, there were far more harpoon heads found at Phillip's Garden East (n=13) compared to Phillip's Garden West (n=1). This implies a slight difference in the activities performed at the two sites. Perhaps hunts and preliminary butchery were initiated out of Phillip's Garden East, with some members of the group using this site as a residence while processing the seal carcasses. It is possible that the residents of the two sites confined their consumption and disposal of edible parts of the carcass to Phillip's Garden West.

Continuing with the assumption that the occupants of both sites cooperated in seal hunting; it is possible that while seal carcasses may have been returned to both sites, some aspect of the activities at Phillip's Garden West may have necessitated the removal of skulls. The possible ritual activities at Phillip's Garden West has been offered as an explanation for the variation in style and overall shape of lithic artifacts at this site (Renouf in press). The artifacts at Phillip's Garden West are unique, while retaining distinct Groswater Palaeoeskimo features (see Chapter 3). Explanations for the variation in tool style at Phillip's Garden West exclude a chronological shift over time as there is overlap with Phillip's Garden East and other Groswater sites in the region (Renouf in press). Furthermore, as I have demonstrated above, the season of occupation at Phillip's Garden West and the range of species exploited is essentially the same as at Phillip's Garden East. Thus with similar general subsistence functions, artifact stylistic differences can not be explained as seasonal or functional. It is possible that the manufacture of this distinct

stylistic variant at Phillip's Garden West is related to some particular ritual activity that also involved the exclusion of seal skulls from the site.

Other evidence from Phillip's Garden West demonstrates that this was not a typical Groswater Palaeoeskimo site. A number of the endblades recovered from Phillip's Garden West were so finely serrated and extremely elongated that they may not have been functional (Renouf in press) (Plate 5.1 and Plate 5.2). These particularly elegant pieces have been found singly in a few other Groswater sites, and in small numbers at the Dorset site of Phillip's Garden, but are common only at Phillip's Garden West.

The ritual treatment associated with the hunting and processing of game by northern hunter gatherers has been and continues to be a widespread and cross-cultural phenomenon (Balikci 1970; Fienup-Riordan 1994; Nuttall 1992, 2000; Søby 1970; Tanner 1979). Preparations for hunts and the treatment of carcasses after capture involve carefully performed rituals to show respect for animals and continued success in harvesting them in the future. It is certain that the close relationship between humans and animals was very important in the past and would have had a series of ritual behaviours associated with it. The relative frequency of some skeletal elements, along with the lithic evidence from Phillip's Garden West may be a tangible indication of ritual behaviour.

Plate 5.1 **Phillip's Garden West Endblades**

Plate 5.2 **Phillip's Garden West Multiple Notched Endblades**

Alternatively, it is possible that the sites were entirely independent of one another, and that both were simply contemporary settlements with some slight differences in the focus of activities. Because of the greater emphasis on hunting at Phillip's Garden East evident in the number and various forms of harpoon heads, this site may have functioned as a hunting, butchering, and processing camp from which some meat was transported. The presence of thirteen harpoon heads at Phillip's Garden East in contrast to the one found at Phillip's Garden West may indicate a site with only marginal domestic activity, and a greater focus on hunting. The lack of most appendicular elements here is unlikely to be due to differential survival, since they are frequent at Phillip's Garden West nearby. Their absence could be interpreted as being the result of transport. The other, Phillip's Garden West, could have represented a more intense residential location where hunting, butchering, processing, consumption and disposal of seals was undertaken with no connection to the hunting camp at Phillip's Garden East.

While it may be true that Phillip's Garden East represents a hunting camp with fewer activities relative to Phillip's Garden West, I believe it is unlikely that two contemporary sites of the same culture located within a short distance of one another would not have had some degree of contact. It is interesting to note that after the abandonment of Phillip's Garden East, there is a shift in the frequency of various elements at Phillip's Garden West. This may be due to a change in the activities at Phillip's Garden West once there was no longer a settlement at Phillip's Garden East. Feature 5E post-dates the occupation at Phillip's Garden East. With the exception of vertebrae and ribs

(again the problem of distinguishing taphonomic processes), the elements identified in this sample are relatively equally represented. All element groups (%MAU) are between 60% and 100%. It appears that there may have been less transport of meat packages from Phillip's Garden West during this later period.

These suggestions are not necessarily exclusive of one another. It is possible that some combination of these factors is at work. It is conceivable that the sites of Phillip's Garden East and Phillip's Garden West were related to one another, and that some activities performed at one site were excluded from the other. The variability in the frequency of body parts at the two sites suggests some degree of functional difference between them.

5.13 Chapter Summary

This chapter introduced the method and theory in the examination of animal bone frequency from archaeological sites. While some researchers have focused on explanations of variability based on the chemical and physical changes that occur to bone over time due to natural causes, others have explored the human agents of taphonomy, including cultural practices, practical considerations, and ideology. Ethnoarchaeological research has expanded our understanding of the dynamic nature of animal carcass treatment, while offering insights into possible explanations of variability.

The body part frequency of samples from Phillip's Garden West were described and compared to meat utility indices and bone mineral density values in an effort to

understand variability at this site over time. All the samples from this site had overall similarities, yet there were degrees of difference between them. The faunal samples from Features 18 and 5A-5D had numerous similarities, whereas, Feature 5E showed more differences from these earlier samples. Explanations were suggested and these samples were compared to those from Phillip's Garden East. Again there were overall similarities, yet compelling differences.

Feature 18 and 5A-5D are contemporary with the sample from Phillip's Garden East, and the sites are within a short walking distance of one another. They were occupied at the same time, and their inhabitants were likely to have been in contact. The variability between the two sites could not be the result of differential preservation or general cultural differences. Variations are believed to be the result of the different treatment of seal carcasses on the sites. It is suggested that different treatment (hunting, consumption and disposal) of the carcass was practiced at the sites, and that both sites were likely connected. This variation in function may have had a ritual aspect, particularly with relation to the treatment of seal skulls, and contributes to an understanding of the variability within the lithic artifact assemblage from Phillip's Garden West.

The next chapter will involve a detailed study of the butchering marks on the seal bones from these sites. This research has the potential to explore differential treatment of the carcass further, and expand our knowledge of Groswater Palaeoeskimo butchering practices.

CHAPTER 6
GROSWATER BUTCHERY

> It is hoped that enough has been demonstrated regarding patterning in cut marks to encourage others to describe their material, so as to begin the task of developing a larger corpus of comparative material for study and use in the further specification of diagnostic characteristics reliably referable to specific actions carried out in the past (Binford 1981:136).

6.1 Introduction

The marks on faunal remains are infrequent but tangible traces of the human activity of cutting animals. The issue for archaeologists is to understand what factors influence or dictate the placement of these marks. Are they the result of a butchery process that is based on the most practical considerations for reducing the carcass to a manageable size, or are there cultural practices, rituals, and gastronomic preferences that dictate some dimension of the reduction process? Lyman (1994:296) lists many of the factors that can influence butchering decisions. Taking these factors into account requires that studying butchering marks cannot be in isolation of the context, or evidence that can shed light on some of the factors Lyman lists below (Table 6.1). The functional purpose of cutting any portion of an animal must also dictate where cuts will be placed. For example, if maximizing the recovery of hide is important, cuts may be in different locations than if hides are not to be processed. It is likely that both practical and cultural considerations determine the placement of marks on the carcass. My honours dissertation compared the Groswater and Dorset processing of seal from the Port au Choix area, using

similar tools (Wells 1988). The results showed some differences that were likely the result of different processing activities. While these signs of past activity are apparent, their interpretation remains elusive.

Table 6.1 Factors that Influence Utilized Butchering Techniques (from Lyman 1994:296)

Natural factors
Prey animal: taxon, size of carcass, age and sex of animal, health status of animal
Nature of procurement:
Scavenged: condition of (rancid?), completeness of carcass.
Hunted; number of animals killed, number of people present, type of kill site (location, accessibility, geological conditions, geographic conditions)
Spatial relationships of kill site, habitation site, and processing areas
Time of day: heat, amount of light remaining, weather
Season of the year: heat, precipitation (type and amount)
Dietary status of people: immediate versus long-term nutritional needs
Cultural factors
Technology: available versus used, curated versus expedient tools
Gustatory preferences
Preparation and consumption: cooking vessel size, preservation technology (if any), storage capabilities and kinds
Ethnic group involved: first animal rituals, kin present at kill site versus kin present at habitation site, selective hunting

Defining patterns in butchery can be difficult for a number of reasons. The marks that we see on bones were not often intentional, the exception being cuts made to split bone open or, rarely, to cut through bone. More often they are the accidental cuts resulting from attempts to remove meat or hide or to disarticulate cartilage-covered ends of elements. In addition, the cuts on an archaeological sample represent all the butchering on an element from the initial kill and subsequent butchery event to consumption, leaving a palimpsest of cutting episodes. While there may have been strict rules for the butchery of

portions of meat in a culture, this regularity can be obscured by cuts made later, during consumption. Finally, there is little ethnographic work that has considered the implications of butchering patterns on sea mammal species and the potential for understanding variability in the archaeological record.

This chapter will review how butchering marks have been studied, the human behaviour and intention that accounts for their appearance on bones, and the problems in attempting to understand the distinction between practical considerations and the possible cultural expression involved in butchering. The bones from both Phillip's Garden West and Phillip's Garden East have been examined for butchering marks. The types of cuts, their number and location are presented. I describe the process of butchering seals by the Groswater Palaeoeskimo. The cut bone from these samples is relatively small, making any comparisons among samples inappropriate. Nevertheless, the data are presented for each sample to facilitate possible future research. The data presented here contribute to an understanding of the butchering process for the Groswater Palaeoeskimo, satisfying Binford's (1981:136) call for the specification of diagnostic aspects of behaviour.

6.2 Review of Butchering Studies

The study of cut marks on faunal remains from archaeological sites has its roots in Plio/Pleistocene (1-2 million years period) research into hominid evolution, particularly possible patterns of faunal resource exploitation (Bunn and Kroll 1986; Shipman 1986a; Shipman and Rose 1983a; Binford 1981). These researchers are specifically interested in

demonstrating whether faunal assemblages uncovered in eastern Africa, particularly at Olduvai Gorge, were accumulations resulting from human (hominid) activity or other agents. Shipman and Rose (1983a) contend that in order to demonstrate human activity in faunal assemblage formation it is necessary to be able to recognize alternative factors that could account for the presence of the assemblage and the apparent damage inflicted upon it. They state, "We suggest that hominid activity can be used as an explanation for the damage, spatial distribution, or other attributes of an assemblage only when alternative explanations can be ruled out and when positive evidence of hominid activity can be found" (Shipman and Rose 1983a:90).

In light of these goals, trends in research were directed toward understanding alternative agents that could account for the accumulation and marks (damage) on faunal material. Some have studied the action of moving water as an agent of accumulation (Behrensmeyer 1975) while others have investigated the effects on bone of weathering, sedimentary abrasion, and trampling (Behrensmeyer 1978; Shipman et al. 1981; Shipman and Rose 1983b). Accumulation and damage caused by carnivores feeding on bone has been well researched and documented in archaeological reports (Cruz-Uribe and Klein 1994; Shipman 1981; Binford and Bertram 1977; Hayes 1982). In order to appreciate the differences between cut marks by humans and the marks left by carnivores, Shipman and Rose (1983a) conducted experiments which involved feeding bones to dogs and then carefully describing the damage and presenting electron microscopic photographs showing the differences. In addition, they cut bone with stone tools of various raw material types

and described the microscopic appearance of the cuts.

Shipman and Rose (1983a) describe the features of cut marks that make them distinct. They are generally v-shaped, or u-shaped in cross section, are elongated and have multiple fine, parallel lines on the walls of the cut. Sometimes cuts display a shoulder effect which simply means small slits parallel to the main slice. Binford (1978, 1981) provides similar details of the morphology of cuts made by humans.

In some of the hominid research, focus has been on determining whether marks seen on faunal assemblages are the result of hominid hunting or scavenging (Bunn and Kroll 1986; Shipman 1986a, 1986b). Shipman (1986a) argues that in order to demonstrate that hunting was the means of resource exploitation, cuts should occur consistently in locations where disarticulation and skinning take place. She did not observe this in her analysis of Pleistocene faunal remains, maintaining that hominids were scavenging rather than hunting their game. The practice of assigning functional meaning to the location of cut marks is a common practice in butchery studies.

In his ethnographic research, Binford (1978, 1981) observed and recorded the butchering of caribou and sheep amongst the Nunamiut of North Alaska, describing the location of cuts and the functional intention of the butcher in the placement of the cut. He states the importance of this aspect of his research: "the information provides a clue to where to look for butchering marks, and also indicates the areas of the anatomy that were most commonly altered or preserve traces of butchering activity' (Binford 1981:98). He reexamined the bones after disposal to confirm his observations. His aim was to document

series of diagnostic characteristics of cut marks that could serve as the basis for inferences about the character of past activities and tool types (Binford 1981:105).

Binford's methods for recording butchering marks on archaeological faunal samples is standard for most (Binford 1981; Shipman and Rose 1983a; Bunn and Kroll 1986; Cruz-Uribe and Klein 1994). He describes the location, orientation of the marks, and suggests a functional reason for the marks. He goes on to point out that cut marks are derived from various stages of processing an animal, and that marks derived from cutting at different stages can leave overlapping marks (Binford 1981:106). The stages most have come to agree on are: 1, skinning, 2, dismemberment, or disarticulation 3, filleting for consumption or storage, which often involves further dismemberment, and 4, marrow consumption which is a later stage in most cases as meat is usually removed from the bone before it is cracked for marrow extraction.

Binford goes on to note the characteristics of each stage. Skinning marks are infrequent and limited to the cranium, including the mandible, and the lower limbs. Here marks tend to encircle the long bones. Binford notes in his ethnographic work that the exact location of skinning cuts will vary according to the intentions of the butcher. On some occasions caribou are skinned merely to retrieve the contents of the animals, while on other occasions skinning is initiated with the intention of using the hide. In this latter situation the location of marks will maximize the recovery of skins by cutting close to the hoof, and further up the leg when meat retrieved is the focus of the butcher. Dismemberment marks tend to be concentrated at points of articulation. He describes the

dismemberment cuts for all elements. Filleting cuts are noted for a number of elements. Binford states that filleting is often performed during initial butchering and has a distinct pattern. Filleting marks are generally longitudinally oriented with regard to the bones on which they appear (Binford 1981:128). They are either long to expose bone for removal, or short to sever meat from areas of muscle attachment. Shorter cuts are generally oblique. They are located on the neck of long bones, under the epiphysis, and commonly in recessed places where stripping meat rather than cutting it would be difficult. Binford's discussion of marks produced during consumption is limited. He states most of the cuts produced during consumption are similar to filleting in location and orientation. He does not, however, provide a detailed description of this butchery stage.

Most of the ethnographic and experimental research into butchery has concentrated on relatively large ungulates such as caribou and sheep. Some aspects of phocid anatomy are quite different from these species and differences in some of the butchering patterns are to be expected. The head and hind flippers are likely to be the only locations of skinning cut marks. The fore flipper is fairly fleshy down to the third phalange. Long bones are generally short on this taxon and thus disarticulation into individual elements may be less likely than on taxon with relatively long limbs. The interior of phocid long bones is not rich in marrow, as it is almost entirely made up of trabeculated bone (Lyman et al. 1992). Marrow is an important product for societies dependent on lean animals such as caribou as they have very little fat in their muscle tissue. Indeed, it is unlikely that there would be need for extracted fat in a society for which

phocids make up the bulk of the meat. Phocids have large quantities of easily accessible fat under their skin. Therefore on the basis of need and character of the bone, it is unlikely that the elements of this taxon would be cracked for marrow removal. In addition, seal marrow would be difficult to extract by boiling as it is a liquid at room temperature, and since it is stored in cancellous bone it would not flow out when the bone is cracked (Outram 1998:245; Hodgetts 1999:91-92).

6.3 Problems of Interpretation in Butchering Studies

Perhaps because butchering studies have been largely rooted in hominid studies, and those concerned with the possible agents for the deposit of bones, little has been discussed about the cultural aspects of this apparent behaviour. Most see butchering as a practical activity that attempts to optimize product returns. As a frame of reference this is very useful and likely to be close to the truth. But as an activity, there is certainly a cultural dimension to the act of butchering. This may be functional and related to seasonal subsistence and settlement practices. As well, there may be a ritual or social aspect to the activity. It is only through the recording of the location of these marks on the bones will we be able to suggest interpretation of the activities that were performed at a site. While the butchery for transport aspect of the activity has been researched (Binford 1978; Lyman 1987; Metcalfe and Jones 1988), few have explored what the marks themselves can reveal. This may be due to the difficulties in the nature of the evidence. As mentioned above, cut marks tend to be relatively rare.

In this section I discuss some of the problems in the interpretation of butchering marks. Sample size is perhaps one of the most problematic areas when a "pattern" of butchery is being sought. I examine how cut marks are quantified, and the relevance of establishing frequency will be examined. Finally I address the importance of recording the type and location of butchering marks to assist in any discussion of animal processing.

The appearance of butchering marks on the bones of a recovered faunal assemblage represents a tiny sample of evidence for the butchering of animals. Shipman and Rose (1983a:86) acknowledge the rarity of cut marks on archaeological samples, and add that it is possible to butcher an entire animal without leaving a single mark. They argue that soft tissue has the ability to shield bones from being cut, and this may account for the low percentage of cuts recorded. When looking at the frequency of cuts it is important to keep in mind the nature of the sample under scrutiny. Of some set of identifiable bone fragments, a sample of them was butchered, and a sample of these were left with a mark, while a sample of these marks are still apparent after various taphonomic processes. It can not be assumed that if one type of bone retains more cut marks than another, that type was butchered more frequently than the other (Lyman 1994:302). This point needs to be kept in mind when examining any frequency data on cut marks.

Lyman (1994:302) states, "if butchery marks are epiphenomena, that is, if they are in some sense an unintended, accidental, fortuitous, or incidental result of butchery activities, then frequencies of butchered bones are potentially ambiguous indicators of the quantitative aspects of human behaviors, and thus terms such as "butchery pattern" would

be inappropriate given its human behavioral implications." Lyman is warning that marks left in the process of meat removal, skinning and disarticulation may be accidental and therefore an ambiguous source for infering butchery patterns. While I think this may be true, I believe that these accidents will occur regularly when a particular bone of a particular species is butchered for the same purpose, and that these cuts are a source of evidence for an activity. Any interpretation may be tenuous; however, it can be of some use in understanding behaviour in the past.

In presenting the results of their examination of bones for butchering marks analysts usually give the number of cut elements from the total examined (Binford 1981; Bunn and Kroll 1986). Lyman (1994:302) warns that the specific study of the frequency of butchering marks is not straightforward. He argues that since the frequency of butchery marks is not necessarily correlated with the frequency of butchered bones, any list of frequencies of cut marks can be potentially ambiguous quantitative indicators of particular human activities. He illustrates this point with an example. For instance, 10 femora and 10 humeri were available for butchering, and 6 femora and 5 humeri were actually cut. Of these, 4 femora and 2 humeri displayed cuts. It is obvious that the number of bones displaying cuts does not necessarily demonstrate a clear quantitative relationship between the cuts recorded and butchering intensity.

Despite these important issues, butchery marks have the potential to reveal important information. These marks are the residue of butchering behaviour that was directed by numerous decisions related to the practical and cultural needs of a people.

These decisions and needs may have changed depending on factors such as the time of year and the purpose for which an animal was to be used. Only by recording this information can we begin to recognize some potential differences in processing for particular cultures, or cross-culturally for groups exploiting and processing the same animals. Despite the problems of cut mark rarity, in order to speculate on the sources and reasons for butchery mark variability it is necessary to record this variability in the cultural, historical and environmental context in which it was manifest.

6.4 Presentation of Butchery Marks for the Groswater Palaeoeskimo Samples

For the most part I follow Binford (1981) in the presentation of my butchery data. Each fragment of bone was examined for cut marks, these confirmed using a low-powered stereoscopic microscope. Cuts are assigned names to describe their morphology based on Shipman (1981). Most are thin smooth slices, probably achieved with the use of a microblade. The only other cut type found in this study is a chop mark, which cuts entirely through the bone. The bone samples have been presented separately; however in discussing butchering behaviour I will combine the samples, as the amount of cut bone from Features 5E, 5A-5D, and PGE is too small to make any interpretive statement.

Tables 6.1-6.3 show the number of cuts for each element. The number of cut bones is also compared to the NISP for each element. Binford (1981:97) compares the MNE to the number of cut bones for each element. Since all of the cut specimens that I have identified are tallied as individuals, with no effort made to distinguish whether they

came from the same element, I feel it is most appropriate to compare the cut sample to the NISP (cf., Lyman 1994:304).

Figures 6.1-6.15 show the location and orientation of cuts recorded for all samples combined. The individual marks do not indicate the exact number of strokes observed on the bones, they are meant to give a general impression of the frequency of marks in a particular region.

Table 6.2 Feature 18 Cut Marks on Phocid Bone

Element	NISP	# Fragments Cut	% Cut per Element
Cranium	107	0	0
Mandible	45	2	4.4
Hyoid	48	4	8.3
Cervical	69	4	5.8
Thoracic	47	3	6.4
Lumbar	26	4	15.4
Caudal	61	2	3.3
Sacrum	7	0	0
Ribs	324	16	4.9
Scapula	44	3	6.8
Humerus	136	7	5.2
Radius	95	6	6.3
Ulna	78	3	3.9
Carpal	353	0	0
Metacarpal	230	12	5.2
Phalange 1 front	206	1	0.5
Phalange 2 front	182	2	1.1
Phalange 3 all	270	0	0
Innominate	26	4	15.4
Femur	57	6	10.5
Tibia	69	2	2.9
Fibula	54	6	11.1
Tarsal	147	3	2
Metatarsal	220	11	5
Phalange 1 hind	181	1	0.6
Phalange 2 hind	113	5	4.4
Total	3086	101	3.3

Table 6.3 Feature 5A-5D Cut Marks on Phocid Bones

Element	NISP	# Fragments Cut	%Cut per Element
Cranium	9	0	0
Mandible	5	0	0
Hyoid	9	0	0
Cervical	9	0	0
Thoracic	2	0	0
Lumbar	2	0	0
Caudal	8	0	0
Sacrum	0	0	0
Ribs	13	2	15.4
Scapula	5	1	20
Humerus	15	1	6.7
Radius	26	2	7.7
Ulna	16	0	0
Carpal	39	0	0
Metacarpal	66	0	0
Phalange 1 front	38	0	0
Phalange 2 front	34	0	0
Phalange 3 all	56	0	0
Innominate	3	0	0
Femur	5	0	0
Tibia	24	1	4.2
Fibula	19	0	0
Tarsal	34	0	0
Metatarsal	42	0	0
Phalange 1 hind	33	0	0
Phalange 2 hind	22	0	0
Total	526	7	1.3

Table 6.4 Feature 5E Cut Marks on Phocid Bones

Element	NISP	# Fragments Cut	% Cut per Element
Cranium	12	0	0
Mandible	3	0	0
Hyoid	3	0	0
Cervical	13	1	7.7
Thoracic	6	1	16.7
Lumbar	1	0	0
Caudal	8	0	0
Sacrum	0	0	0
Ribs	11	1	9.1
Scapula	7	0	0
Humerus	25	0	0
Radius	17	0	0
Ulna	11	1	9.1
Carpal	36	1	2.8
Metacarpal	31	1	3.2
Phalange 1 front	20	0	0
Phalange 2 front	12	0	0
Phalange 3 all	42	1	2.4
Innominate	8	0	0
Femur	17	2	11.8
Tibia	24	1	4.2
Fibula	22	0	0
Tarsal	21	0	0
Metatarsal	64	2	3.1
Phalange 1 hind	41	1	2.4
Phalange 2 hind	11	0	0
Total	455	13	2.9

Table 6.5 Phillip's Garden East Cut Marks on Phocid Bones

Element	NISP	# Fragments Cut	%Cut per Element
Cranium	149	2	1.3
Mandible	23	1	4.4
Hyoid	9	0	0
Cervical	7	0	0
Thoracic	4	0	0
Lumbar	4	0	0
Caudal	10	0	0
Sacrum	0	0	0
Ribs	24	1	4.2
Scapula	2	0	0
Humerus	4	0	0
Radius	14	0	0
Ulna	12	0	0
Carpal	63	0	0
Metacarpal	42	0	0
Phalange 1 front	32	1	3.1
Phalange 2 front	35	0	0
Phalange 3 all	50	0	0
Innominate	4	1	25
Femur	7	0	0
Tibia	8	0	0
Fibula	3	0	0
Tarsal	25	0	0
Metatarsal	99	3	3
Phalange 1 hind	91	0	0
Phalange 2 hind	36	0	0
Total	738	9	1.2

6.4.1 Cranium

Cuts occur on the cranium, mandible and hyoid bones. Cuts to the cranium were noted only at Phillip's Garden East, perhaps because of the large number of cranial fragments in that assemblage. These occur on the lateral surface of the zygomatic arch,

and around the eye orbit. These cuts are likely to be involved in skinning the animal. Cuts on the mandible are found in a number of locations. They run obliquely on the lateral surface below the mandibular condyle, perpendicular to the jaw on the lateral surface near the goneal angle, and on the medial surface just below the mandibular condyle (Figure 6.1). Most of these cuts appear to be intended for the removal of the mandible from the skull. Cuts to the hyoid bone occur perpendicular to the length, along the shaft. These cuts were likely to facilitate the removal of the tongue.

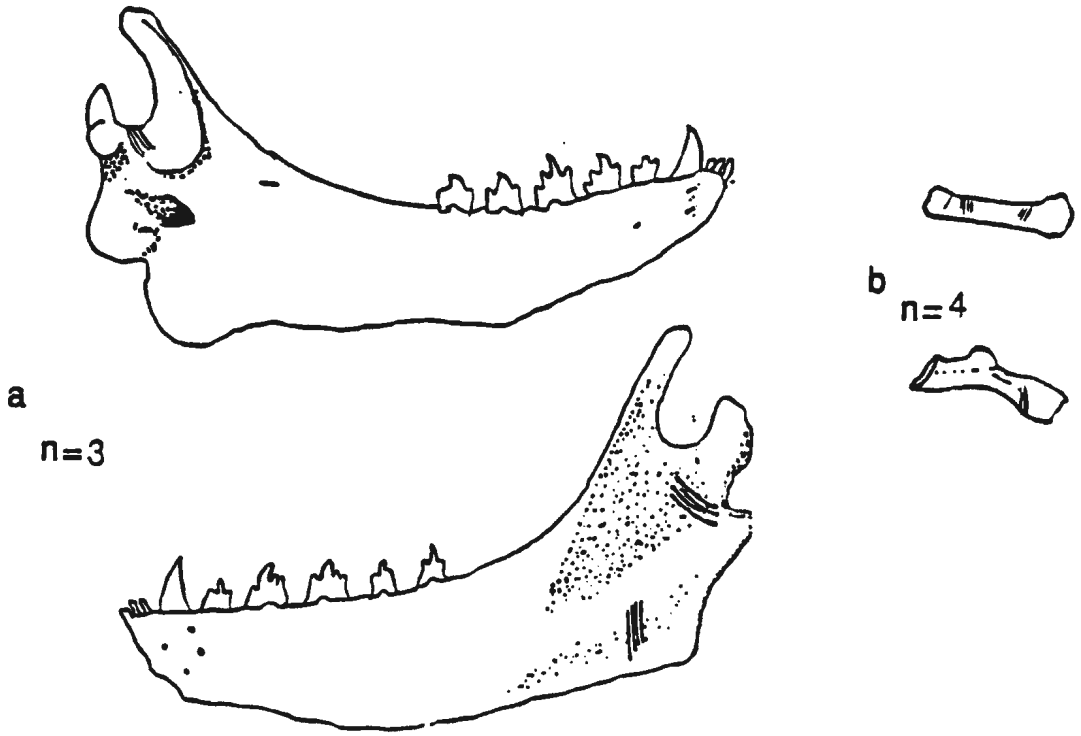


Figure 6.1 Location of Cuts on Phocid a) Mandible and b) Hyoid

6.4.2 Vertebra

All types of vertebrae show evidence of cutting (Figure 6.2). Most cuts on the cervical vertebrae are concentrated on the ventral surface of the anterior articular processes. These cuts run across the processes, or slightly oblique to that portion. These cuts could have been made to separate sections of the vertebral column from one another or to remove meat in this region. A few cuts across the ventral surface of the vertebral body have also been recorded, most likely in meat removal. Cuts on the atlas vertebrae are noted for Feature 18 and Feature 5E. These cuts are under the anterior condylar facet and likely were involved in the removal of the skull. Cuts on the thoracic vertebrae are concentrated near the transverse processes and would have been placed there during the removal of ribs from the vertebrae. Other cuts on this element are on the ventral surface of the centrum and may have been involved in separating vertebrae or meat removal. The lumbar vertebrae are cut in the same places as the cervical, across the ventral surface of the anterior articular processes and on the ventral surface of the body, near the posterior end of the element. Caudal vertebrae are cut across the body on the element. Of the two examples seen in this collection, one is on a very young individual and may have been a result of skinning.

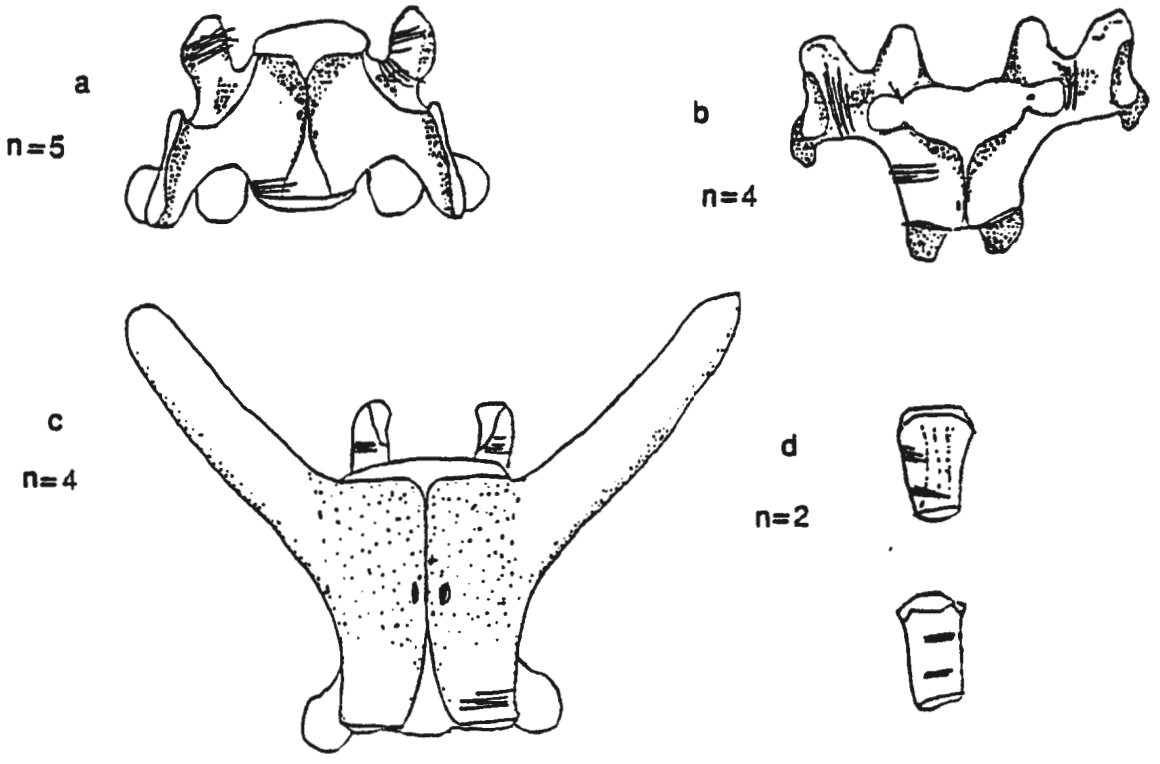


Figure 6.2 Location of Cuts on Phocid a) Cervical, b) Thoracic, c) Lumbar and d) Caudal Vertebrae

6.4.3 Rib

A number of locations are recorded for cut marks on ribs (Figure 6.3). Many occur near the head of the element and are likely the result of disarticulation from the vertebral column. These marks tend to be near the ventral surface of the element and run in a transverse, or oblique direction. In addition, other cuts occur further along the shaft of the rib, generally transverse to it, and on the ventral surface of the bones. These cuts are interpreted as meat removal marks.

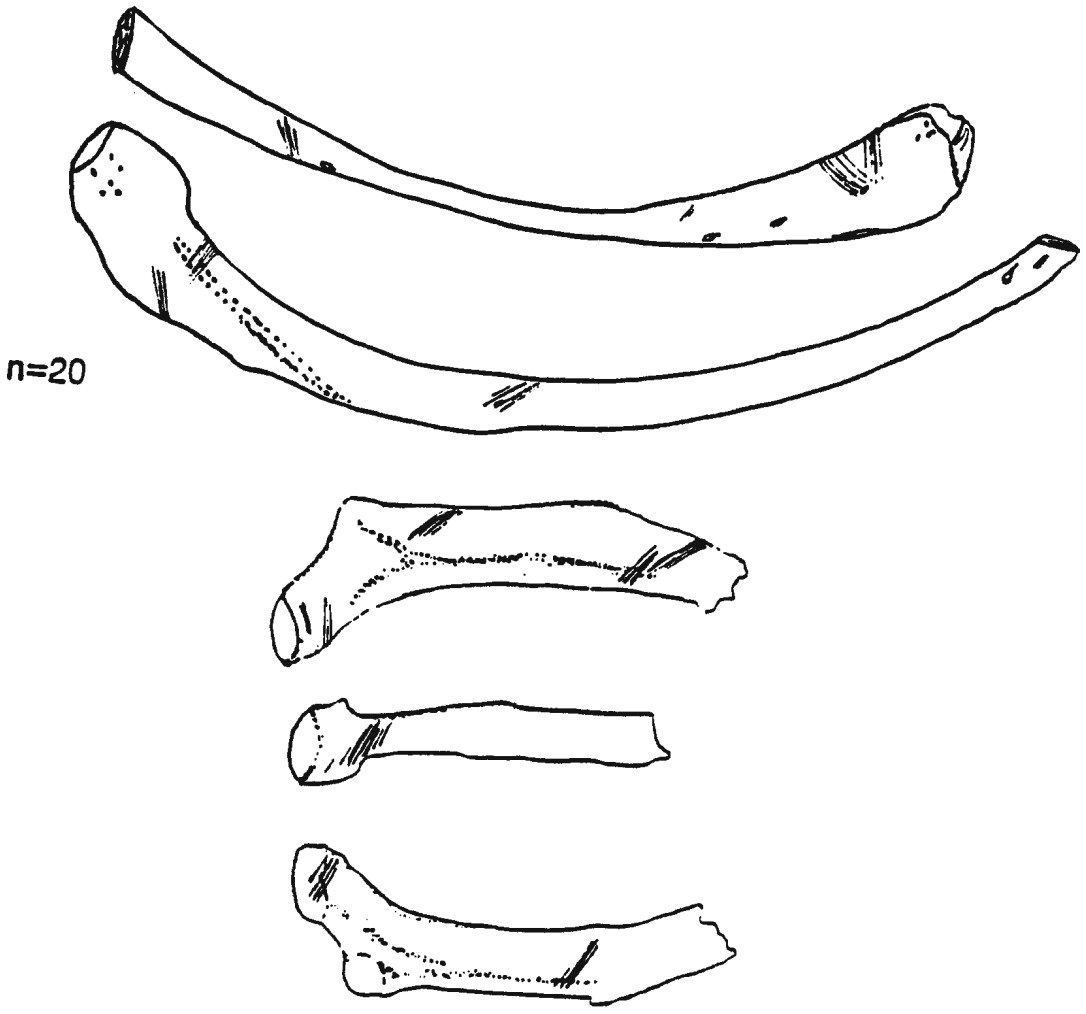


Figure 6.3 Location of Cuts on Phocid Rib

6.4.4 Forelimb

This body portion includes the scapula, humerus, radius, and ulna. Cuts on scapulae occur in the vicinity of the glenoid fossa and likely involve disarticulation from the humerus. Cuts most often occur on the lateral surface of the element, but also on the medial surface (Figure 6.4). Cuts on the humerus occur in a number of locations. Many of the cuts are in areas of muscle attachment and are thus likely to have been involved in meat removal (Figure 6.5). Cuts on the anterior surface of the bone near the head are possibly the result of disarticulation from the scapula. Cuts occur on the diaphysis portion of the medial, posterior and anterior surfaces. Elsewhere, cuts occur on the tubercle lateral to the head. Almost all cuts on the radius are in the area of the proximal head on all surfaces (Figure 6.6). They run transversely across the element and appear to be disarticulation cuts. A few cuts are interpreted as indicators of meat removal. They occur just distal to the radial tuberosity, and on the lateral surface of the shaft. Cuts on ulnae occur under the articular facets on the anterior and medial surfaces. These cuts are likely for disarticulation from the radius (Figure 6.7).

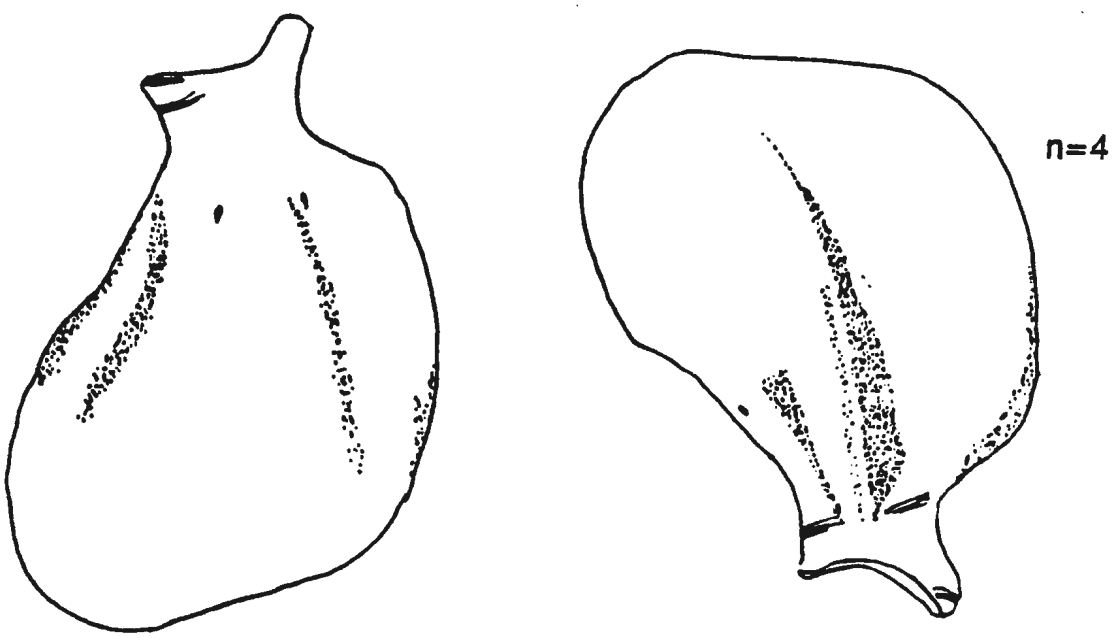


Figure 6.4 Location of Cuts on Phocid Scapulae

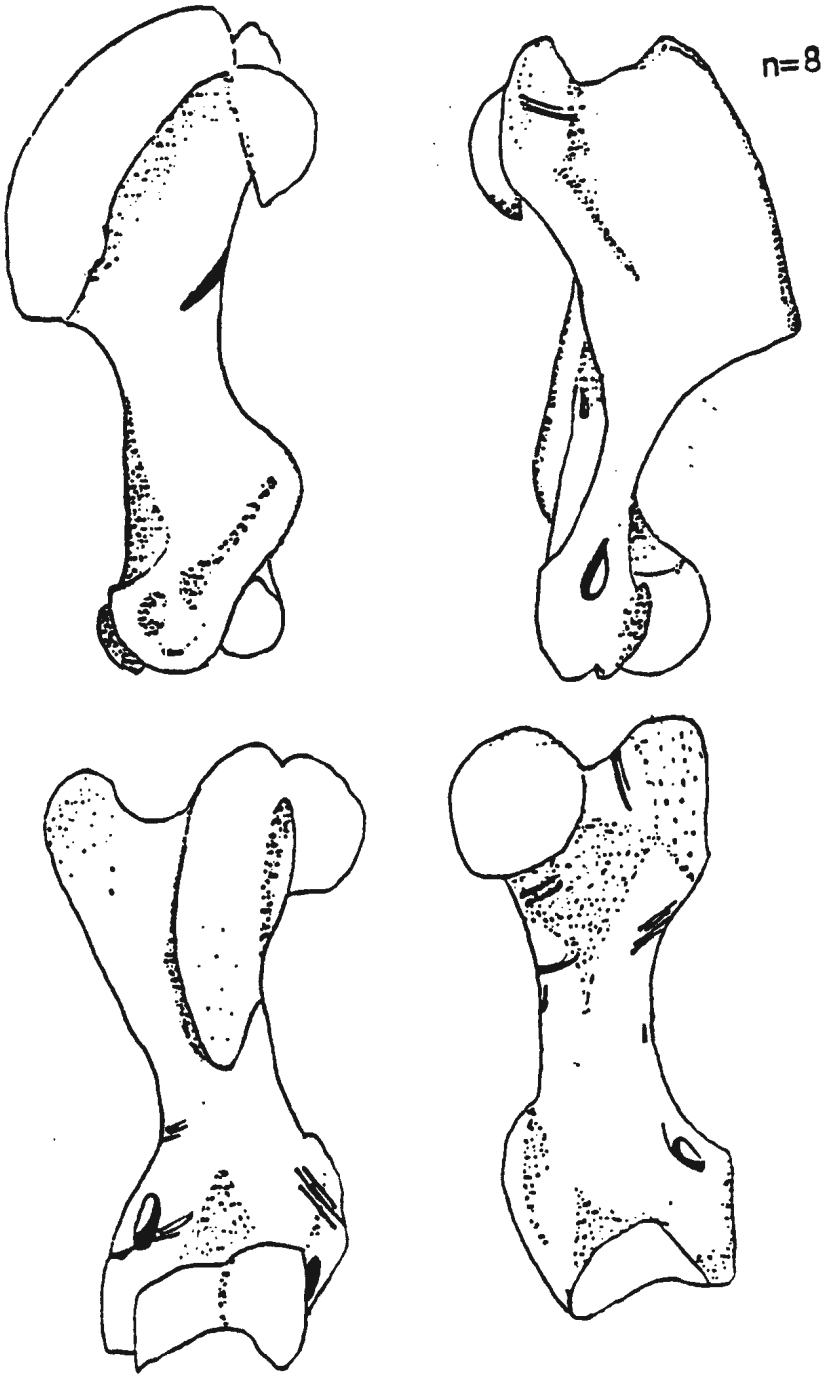


Figure 6.5 Location of Cuts on Phocid Humeri

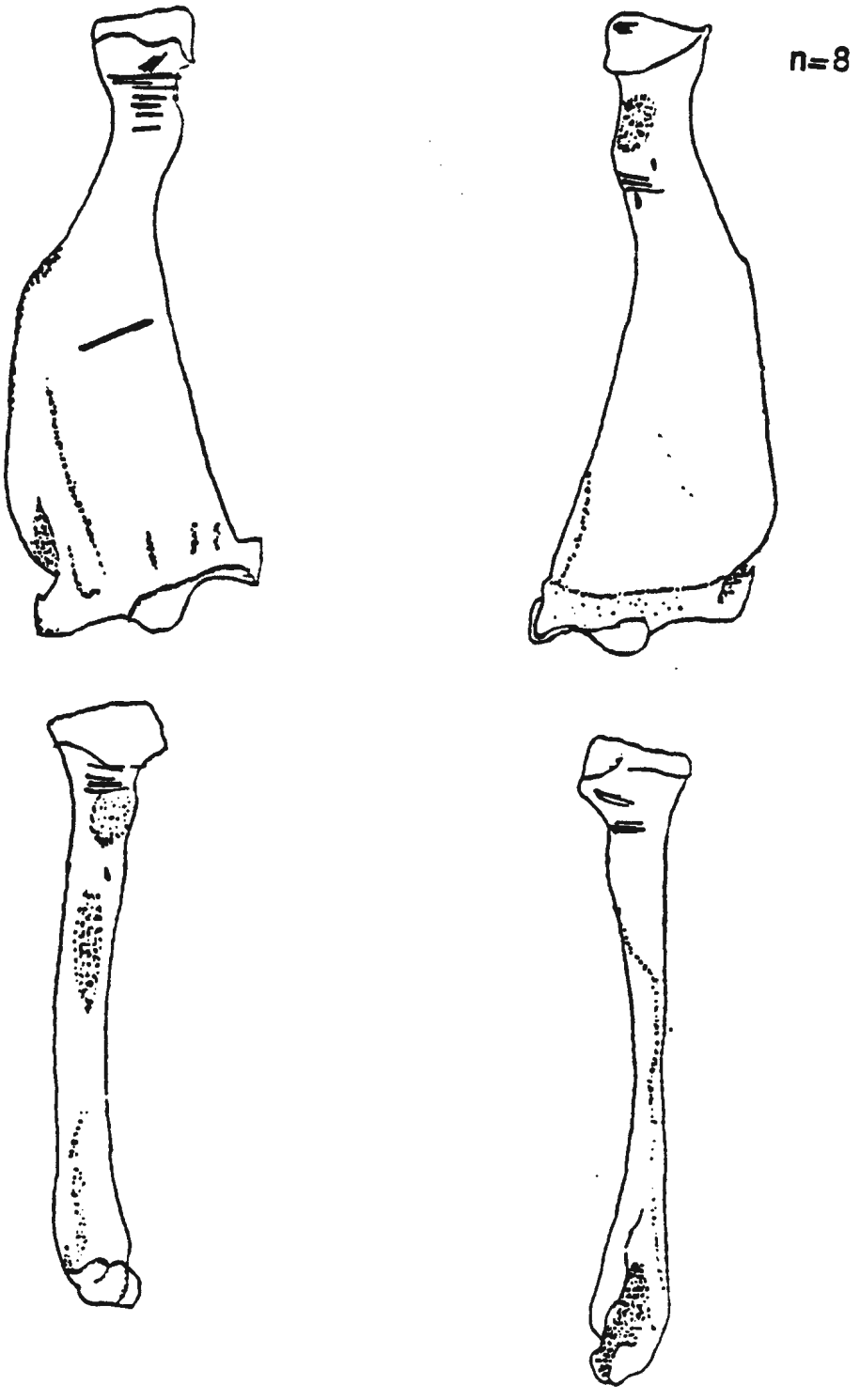


Figure 6.6 Location of Cuts on Phocid Radii

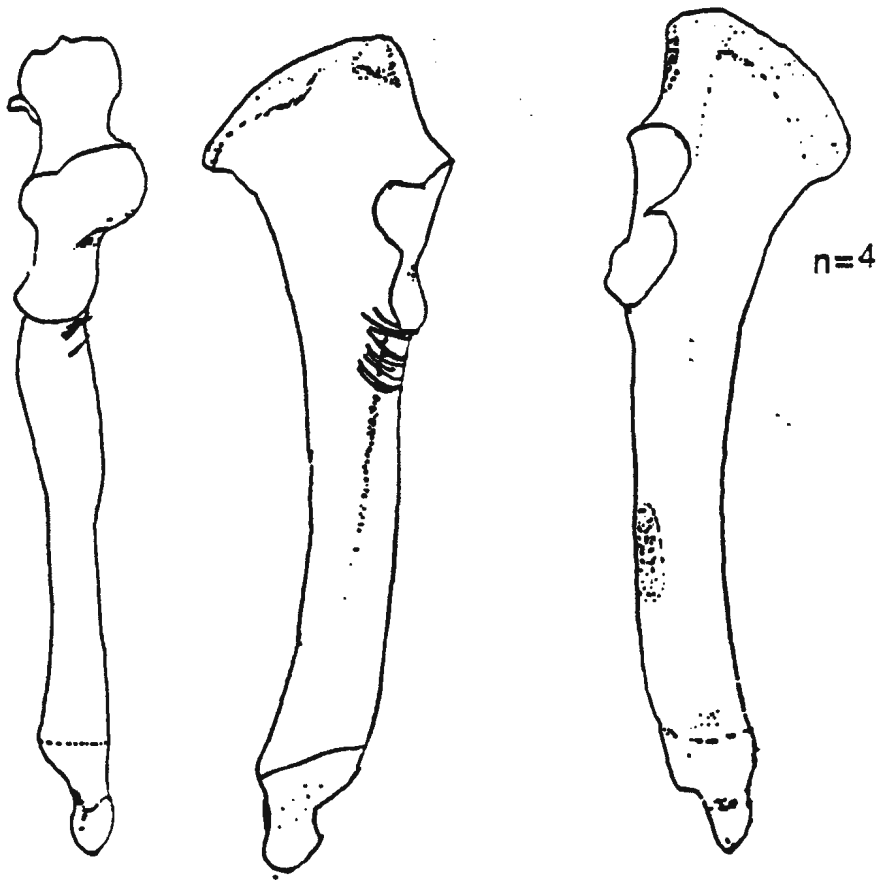


Figure 6.7 Location of Cuts on Phocid Ulnae

6.4.5 Front Flipper

The elements of the front flipper include the carpals, metacarpals and front phalanges. Cuts occur on one carpal at an articular surface (Figure 6.8). Cuts also occur on all metacarpals and are concentrated at the proximal articular areas. Many of the cuts are on the articular surfaces in a number of aspects and appear to have functioned in

disarticulation (Figure 6.8). Second phalanges are cut at the proximal end on the articular surface for disarticulation or skinning, and one third phalange is cut on the dorsal surface near the proximal end (Figure 6.9). This may be interpreted as a skinning mark.

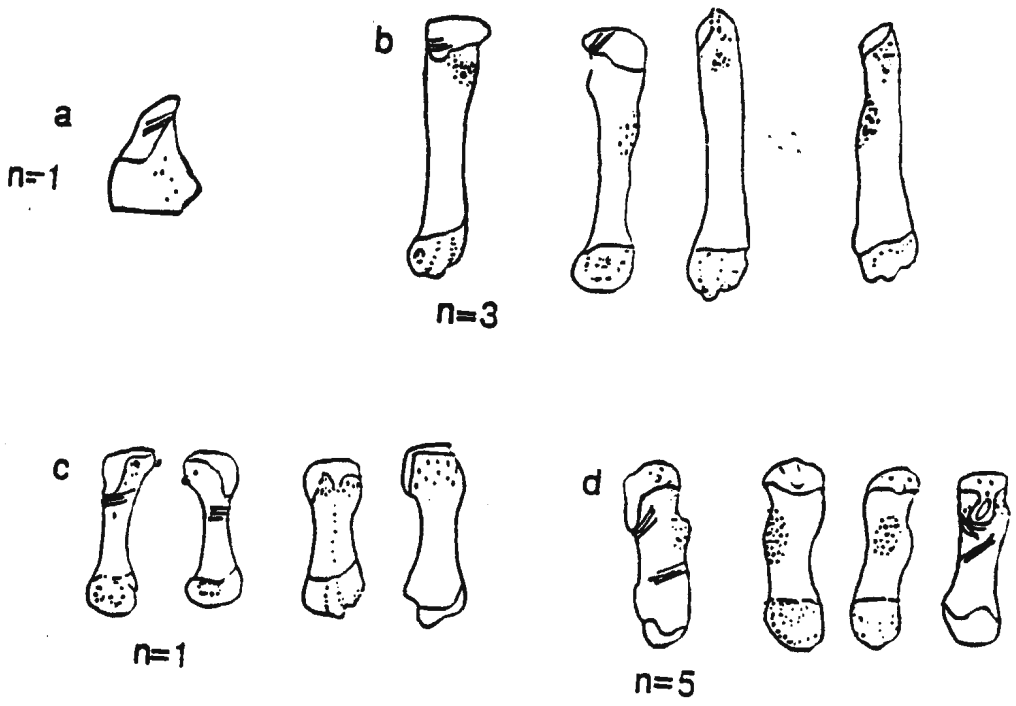


Figure 6.8 Location of Cuts on Phocid a) Carpals I, b) Metacarpal II, c) Metacarpal IV, and d) Metacarpal V

Figure 6.9 Location of Cuts on Phocid Front Phalanges

6.4.6 Hindlimb

The elements of the hindlimb include the innominate, femur, tibia and fibula. A number of types of cuts are apparent on the innominates in this study (Figure 6.10). Some, concentrated in the region of the acetabulum, are interpreted as disarticulation marks. Numerous cuts also occur transverse to the length of the bone on the ilium, and on the pubis. These are interpreted as meat removal marks. Cuts on the femur appear to be for disarticulation. Cuts on the proximal end of the femur are concentrated in the area of the head, with marks running around the underside, or on the head itself (Figure 6.11). Cuts on the distal end are on the posterior surface running both lengthwise and transverse to the bone. These are likely cuts for disarticulation from the tibia and fibula. Only one mark was seen in the proximal area of the tibia and fibula (Figure 6.12). This was a chop through the bone near the proximal fibula. It is difficult to explain this cut as there is no marrow to be extracted from these bones, and the need for fat would not be likely as these sea mammals provide this in large accessible amounts in their blubber layer. It is possible that this cut was put here to separate the bones for meat removal. Otherwise all cut marks on these elements occur on the distal end on the epiphyses. These are interpreted as disarticulation cuts.

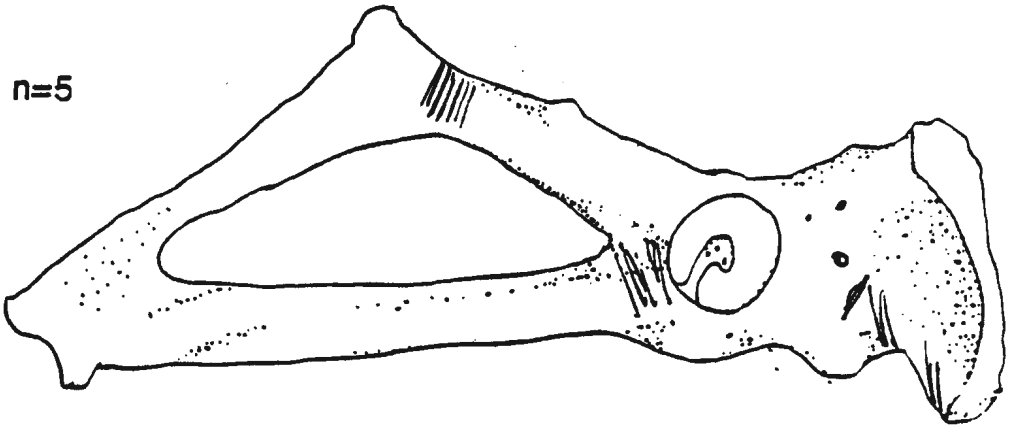


Figure 6.10 Location of Cuts on Phocid Innominates

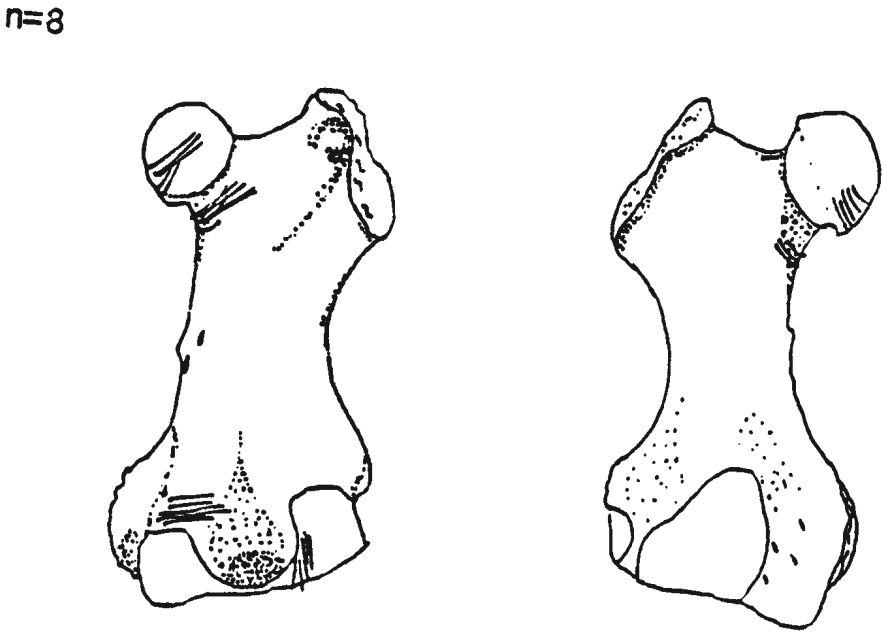


Figure 6.11 Location of Cuts on Phocid Femora

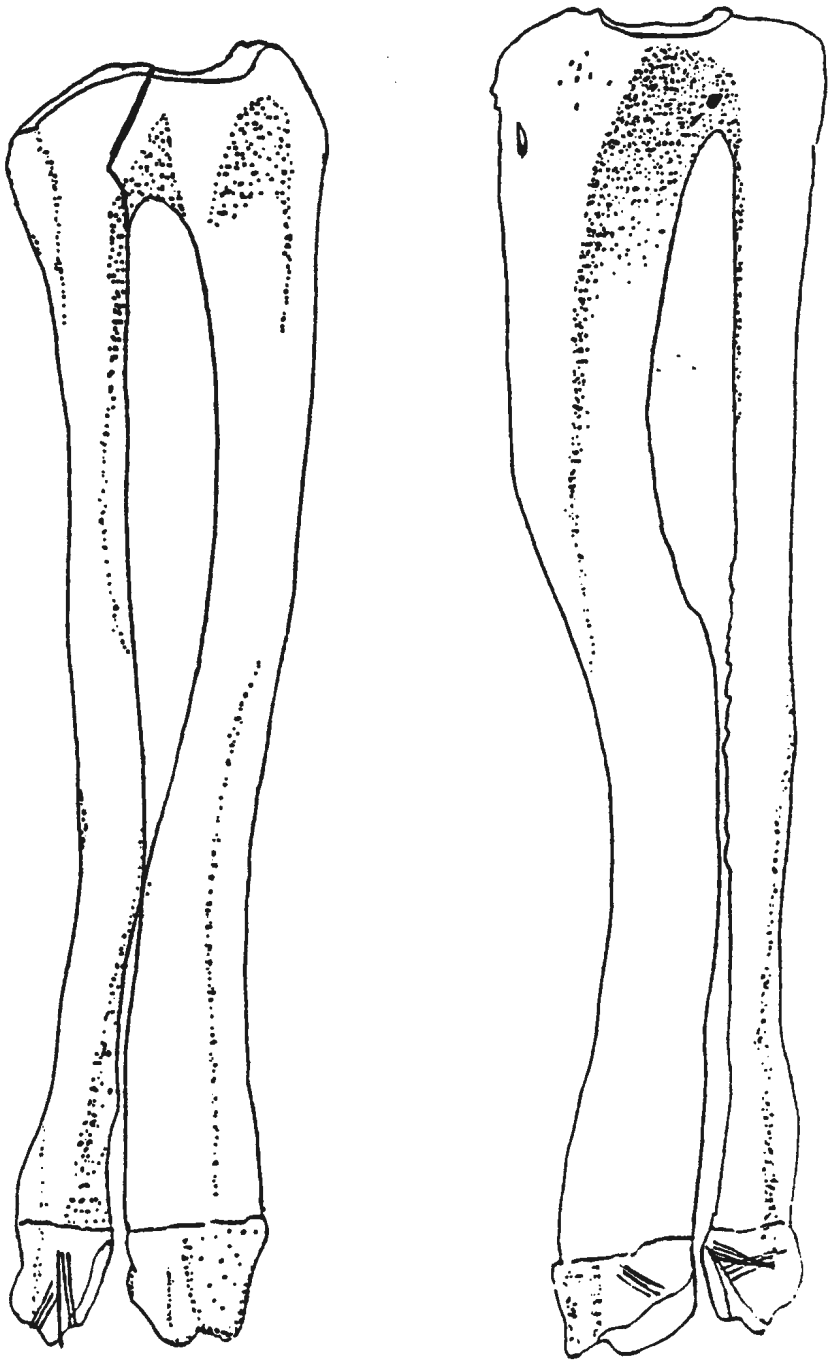


Figure 6.12 Location of Cuts on Phocid Tibia and Fibula

6.4.7 Hind Flipper

The hind flipper includes the tarsals, metatarsals and rear phalanges. Tarsals 1 and 2 show evidence of having been cut (Figure 6.13). Both elements show evidence of disarticulation marks. The astragalus shows some cuts on the anterior articular surface, likely for disarticulation from the upper limb (Figure 6.13). Cuts occurring on the metatarsals indicate a number of functions (Figure 6.14). Most cuts occur transverse across the proximal end of the metatarsals suggesting disarticulation. Cuts on the shaft are also transversely across the elements, with a few running longitudinally. These cuts indicate skinning and or meat removal. Phalanges are cut near articular ends transversely across the elements (Figure 6.15). Most cuts are on dorsal and ventral surfaces, and there are a few oblique cuts. As this area of the seal anatomy is not meaty, these cuts are interpreted as skinning marks. Alternatively, the fact that they are often close to articular ends suggests disarticulation. It is possible that the Groswater were removing small amounts of meat from the hind flippers. Perhaps there was a need to maximize meat recovery, or this region of the body may have been considered particularly tasty and thus worth the extra effort to retrieve.

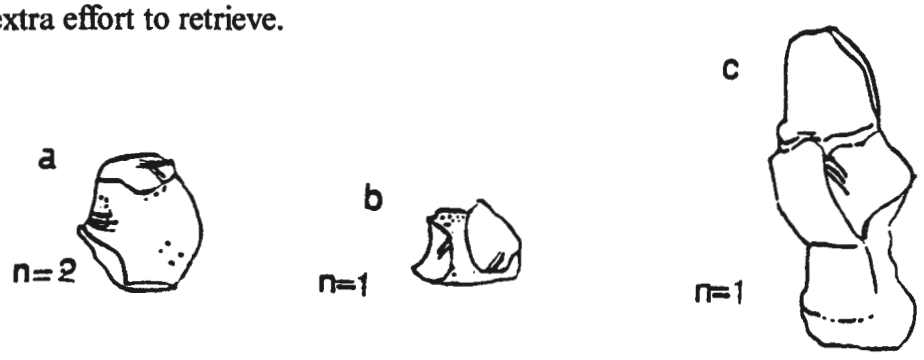


Figure 6.13 Location of Cuts on Phocid a) Tarsal I, b) Tarsal II, and c) Astragalus

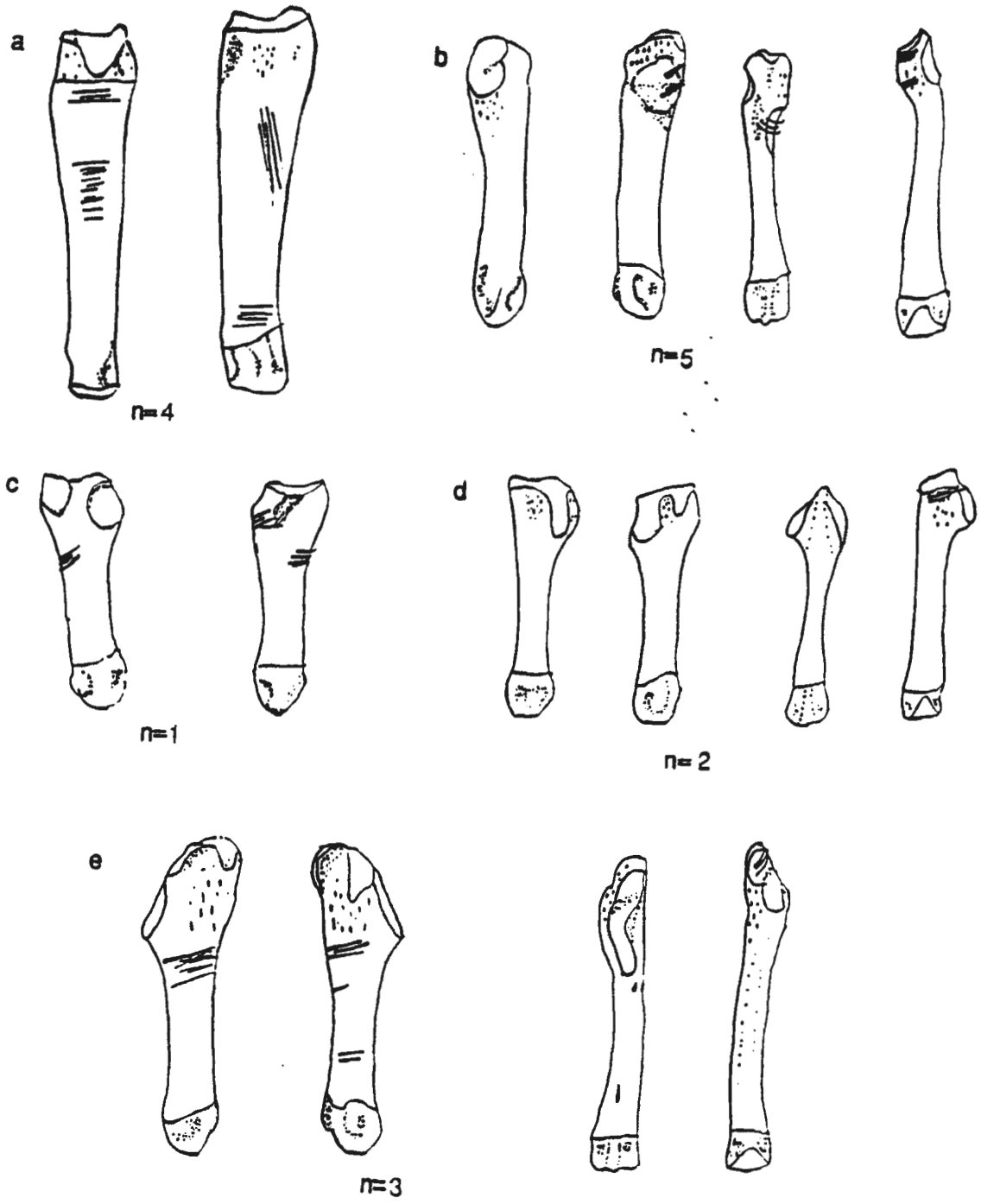


Figure 6.14 Location of Cuts on Phocid a) Metatarsal I, b) Metatarsal II, c) Metatarsal III, d) Metatarsal IV, and e) Metatarsal V

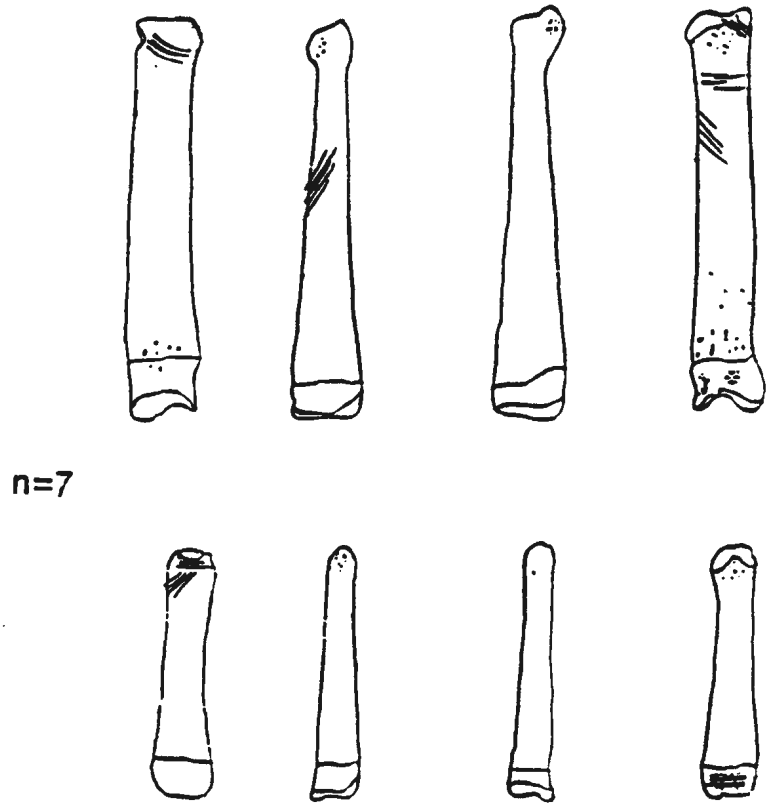


Figure 6.15 Location of Cuts on Phocid Hind Phalanges

6.5 Butchery Sequence

It is difficult to distinguish the order in which portions of the seal were butchered, as the marks reflect a palimpsest of cutting events. With this in mind, I will summarize the evidence of the cut marks into a coherent description of how seals were butchered.

Hide removal would have been the obvious first step. Cuts on the head and

flippers are the only places where evidence for this activity are likely to be apparent. This sample showed marks that could have been interpreted as skinning marks. They occur on the front and hind metapodials and phalanges. Cuts on the vertebrae and ribs tend to be most common on the ventral surfaces of the bones indicating that much of the cutting was done with the seal lying on its back. These vertebrae and ribs were disarticulated from one another and meat was removed from them. Cuts on the forelimb bones indicate that the scapula, humerus, radius and ulna were disarticulated, probably at various stages in the butchering sequence. Cuts are more common on the scapula and radius for disarticulation from the humerus. The ulna shows the greatest frequency of cuts for disarticulation from the radius, and the carpals are more commonly cut on the proximal end for removal from the upper limb bones. The front flipper was cut to disarticulate this portion, perhaps for cooking.

The innominate and femur were cut from one other at their point of articulation. Cuts on the femur also indicate disarticulation from the tibia and fibula. The tibia and fibula were seldom cut although they were disarticulated from the hind flippers at the tarsals. The hind flipper was cut, probably in skinning, but also possibly to remove the small amounts of meat on these bones.

6.6 Discussion of Groswater Palaeoeskimo Butchery

The preceding section describes the marks recorded in the examination of faunal samples from two Groswater Palaeoeskimo sites. The results are not unlike those I

observed on another sample of phocid bones from Phillip's Garden East (Wells 1988). In that research I examined the butchering marks on two samples of phocid bone remains from the Port au Choix region. One sample was from the Phillip's Garden East and the other was from a midden feature at the Middle Dorset site of Phillip's Garden. I was interested in any apparent differences in the butchering practices of the two cultures. The samples had a number of features in common, suggesting that butchering decisions were largely determined by the anatomy of the seal. Nevertheless, some variation could be explained as concerning human decisions possibly related to cultural preference or the functional requirements of the sites' occupants. Both sites were residential locations from which sealing operations were conducted. The sites were situated very close to one another on the outer coast of the Point Riche peninsula (Figure 1.1). Preservation conditions were the same for each site. The material culture of the two groups was similar. Both the Groswater Palaeoeskimo and Middle Dorset are part of the Arctic Small Tool Tradition, which includes small microblades and bifaces for cutting, and no large or heavy chopping tools. While it was expected that the two cultures would process seal in much the same way, as practical considerations would dictate the placement of most marks, it was of interest to note that there were some differences in the way seal was processed.

Of particular interest was the treatment of the hind flippers. The Groswater Palaeoeskimo tended to devote greater efforts to the butchery of the hind flippers (n=18, NISP=346, 5.2%). Both articular ends and shafts of phalanges showed cut marks. Very

few (n=2, NISP=268, 0.8%) hind phalanges showed cut marks for the Middle Dorset sample. It was suggested that skinning may have begun at this point on the carcass among the Groswater in order to maximize the recovery of hides, and higher up the carcass for the Middle Dorset, getting less hide per seal. It is also possible, since many of these cuts were on the articular ends of the hind flippers in the Groswater sample, that these hunters were under greater stress to maximize the recovery of even small amounts of meat from the hind flipper. In discussions with Inuit hunter and Minister of Sustainable Development, Olayuk Akesuk of Cape Dorset, Nunuvut, I learned that meat of the hind flippers has always been eaten by Cape Dorset Inuit. Thus two interpretations are offered for the variation witnessed between the two Palaeoeskimo cultures, one that the small amounts of hind flipper meat is eaten, either to maximize meat in the diet, or out of culinary preference, or that an attempt was made to recover greater amounts of hides in the Groswater occupation. It is possible that the Middle Dorset sample was from an occupation during which hides were not being taken, or that the decision to maximize the recovery of hides was not seen as worth the extra effort of cutting around the phalanges. In addition, it is possible that the hind flipper meat was not consumed.

Taken alone the samples from this thesis show much less butchery of hind flippers (n=7, NISP=528, 1.3%), but when these samples are combined with the Groswater Palaeoeskimo samples used in previous research (Wells 1988) a substantially higher frequency of cut hind flippers is observed (n=25, NISP=874, 2.9%). The sample size of Groswater Palaeoeskimo faunal material is much larger than the Middle Dorset sample,

and may account for the apparent differences in the frequency of cut hind flippers. A larger sample of Middle Dorset cut bone may contribute to a greater understanding of the extent of differences between the two Palaeoeskimo cultures in their treatment of seal carcasses from this region.

6.7 Chapter Summary

The Groswater Palaeoeskimo butchered their game probably with the intent of maximizing meat recovery using the least amount of effort (Zipf 1965). This was achieved by cutting at areas of articulation and muscle attachment. In addition, it is likely that these people were interested in maximizing the recovery of hides and meat, and willing to invest some considerable effort in cutting around the phalanges to achieve this. In an earlier study (Wells 1988) this same effort seems not to have been made by a later Palaeoeskimo group exploiting phocids in essentially the same location. The analysis of butchering marks has the potential to expand on our knowledge of the range and nature of activities performed at sites. Two areas need to be expanded upon to shed more light on meaning in the cut marks. Ethnoarchaeological research has focused on butchery as it relates to meat utility and transport. Ethnographic work on the decisions hunters make in the placement of cuts can offer interesting insights into activities at sites, seasonal processing differences, and any apparent differences in the location of some cuts during times of scarcity, and when food is shared. Secondly, more faunal analysts need to present the results of their observations on the butchery of animals. While the assumption that all

animals will be cut in locations that maximize meat return for least effort, there are likely to be some differences which need to be explored. Comparative research is one way of exploring the variation that is likely to exist. The meaning or explanation of differences can then be explored. In this chapter I have answered Binford's (1981:136) twenty year old call for researchers to describe their material in order to study the diagnostic characteristics of actions carried out in the past. It is my hope that my results inspire others to approach this interesting source of anthropological information.

CHAPTER 7
CONCLUSION

Animals play a wide range of roles in human life. They provide food, shelter, clothing, status, symbols, and companionship. These roles and the social meaning of animals extend beyond their nutritional and economic value. Zooarchaeological research has contributed substanially to our understanding of these roles (Reitz and Wing 1999:332).

The preceding chapters present the analysis and interpretation of faunal remains from Phillip's Garden West and Phillip's Garden East. In some ways this analysis supports previous interpretations of Groswater Palaeoeskimo settlement and subsistence. Nevertheless the detailed level of analysis offered a precise quantitative description of relative frequency of species in the diet of the sites' inhabitants and new insights into the nature of the occupation at both Phillip's Garden West and Phillip's Garden East.

Sea mammal exploitation, particularly of the large harp seal population that passed close to this coast, dominated the subsistence activities at both sites. A few other animals, including birds, terrestrial mammals and fish, added some small amount of variety to the diet; however the frequency of these other species was marginal compared to the seal.

Harp seals are available in the region for a number of weeks during the spring and summer. While some limited evidence suggests occupation during other times of the year, it is most likely that the sites were occupied only when the harp seals were available because of their overwhelming dominance in the faunal samples. A winter hunt of harp seals is a possibility, but evidence is not strong. Harp seals tend to travel down the north

side of the Strait of Belle Isle during the winter, although some occasionally stray closer to the Great Northern Peninsula. A small number of seal bones recovered in these samples appeared to be from fetal animals. However, it is difficult to distinguish the age of these possibly fetal specimens from those of very young individuals, and as there were very few elements there is not enough evidence to suggest a winter hunt.

This analysis substantiates some earlier interpretations of settlement and subsistence (LeBlanc 1996, 2000; Renouf 1994, in press). LeBlanc (1996:122) suggests that the Groswater Palaeoeskimo settlement and subsistence system involved an intensive exploitation of coastal resources, particularly seal. Results of the analysis in this thesis agree with this interpretation. Any interpretation suggesting a mixed economy with exploitation of a variety of species is ignoring the overwhelming contribution seal made to the diet at these sites. While a variety of species was found in the samples, their low numbers do not suggest a great contribution of meat to the diet.

Faunal preservation at Phillip's Garden West and Phillip's Garden East forms the basis for recent interpretations of Groswater Palaeoeskimo settlement and subsistence LeBlanc 2000, Renouf 1994, in press). Yet basing an interpretation on evidence from two sites where faunal preservation is particularly good can be misleading. The Point Riche and Port au Choix peninsulas located just south of the Strait of Belle Isle are particularly rich in harp seal. This is not necessarily the case at all other Groswater Palaeoeskimo sites where greater emphasis may have been directed toward a greater variety of animals. Nevertheless, as the faunal samples from Phillip's Garden West and Phillip's Garden East

are similar to those found on other sites in the region such as at Factory Cove and Peat Garden, it is likely that settlement and subsistence in the region of the Great Northern Peninsula and Strait of Belle Isle region is characterized by coastal sites occupied during the spring and summer for the intense exploitation of harp seal.

The analysis of phocid body part frequency revealed a number of differences in the way seal was treated at the two sites. During the period when the sites were occupied at the same time, seal crania were consistently absent from Phillip's Garden West. Crania are high in bone mineral density, and since it is very likely that butchery of these animals took place at this coastal site, and crania would not have been transported for meat value, their absence can only be explained as an intentional exclusion from the site. Either they were removed from the site or were never brought there. This absence is remarkable as most other Palaeoeskimo sites with faunal preservation yield relatively high numbers of crania. Conversely, at Phillip's Garden East seal crania are the most highly represented element. In addition, while vertebrae and ribs were consistently low in frequency at both sites, front and hind limbs with the exception of hind flippers, were more common at Phillip's Garden West than at Phillip's Garden East. While there may have been some differences in preservation at the sites, their proximity, with the same underlying bedrock suggests that preservation conditions would be similar at the two sites.

The nature of the relationship between the two sites is not clear and various scenarios are explored. Differences between the two sites are fewer once Phillip's Garden East was abandoned. Feature 5E at Phillip's Garden West postdates Phillip's Garden

East, yet the seal body part frequency is very similar to Phillip's Garden East. Crania in particular are much more frequent at Phillip's Garden West after the abandonment of Phillip's Garden East. This suggests that while the sites were contemporary, seal processing between the two may have been different. It is possible that there was cooperation between the two sites to some degree with some of the processing activities taking place at Phillip's Garden East and others at Phillip's Garden West.

Of particular interest is the unusual lithic assemblage from Phillip's Garden West. Raw material is frequently more colourful, and artifacts are manufactured with stylistic attributes including exquisite edge serration and surface grinding; and tools are generally longer and thinner than typical Groswater Palaeoeskimo lithics. Renouf (in press) argues that this assemblage is not the result of chronological or cultural differences but the consequence of ritual activities performed at the site. The exclusion of crania from this site is one more unusual attribute of the site that distinguishes it from other Groswater Palaeoeskimo, and indeed Palaeoeskimo sites in general. It is likely that the ritual activities performed at Phillip's Garden West included the exclusion of seal crania during its earliest occupation. It is not surprising that this site be an important location for ritual activities surrounding seal exploitation since the availability of seal is vitally important to the diet of the Groswater Palaeoeskimo in the whole region of the Great Northern Peninsula.

This research project includes a study of cut marks on the bones from these sites. This aspect of the research is mostly descriptive; however it is hoped that as comparative

data becomes available it will be possible to understand the processes, both practical and cultural that dictate to disarticulation of game.

The Point Riche and Port au Choix peninsulas remain remarkable locations for the exploitation of the sea's riches. In the past this was no different. The annual arrival of huge seal herds marked the beginning of a season of abundance for the Groswater Palaeoeskimo. These animals would have had an enormous importance both in the sacred and the secular. The present research reveals some aspects of this relationship between humans and the animals they depend upon for survival.

Appendix A

NISP for species previously identified from Phillip's Garden East by Darlene Balkwill (taken from Kennett 1991)

SPECIES	NUMBER OF ELEMENTS
Mammals	
beaver	6
red fox	2
arctic/red fox	3
marten	10
caribou	7
bearded seal	7
harbour seal	2
ringed seal	2
harp seal	201
hooded seal	10
grey/harp seal	1
grey/hooded seal	9
harp/harbour	1
ringed/harbour	4
seal	7218
unidentified mammal	20451
Birds	
Canada goose	1
snow/Canada goose	1
common/king eider	22
oldsquaw	2
white-winged scoter	1
eider/white-winged scoter	1
duck	19
bald eagle	6
willow ptarmigan	2
willow/rock ptarmigan	1
great black-backed gull	80
large gull	354
dovekie	1
common/thick-billed murre	9
murre/razorbill	1
black guillemot	5
blue jay	1
common raven	1
unidentified bird	1295
Fish	
Atlantic herring	2
Atlantic cod	3
American plaice	2
unidentified fish	2
Class Uncertain	170
Total	29915

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